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# A sip off the old block:

Empirical and prevention insights  
into the role of parents in the development  
of alcohol use in children



Suzanne Mares

# A sip off the old block:

Empirical and prevention insights into the role of parents  
in the development of alcohol use in children

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**Promotor**

Prof. dr. R. C. M. E. Engels

**Copromotor**

Dr. A. Lichtwarck-Aschoff

**Manuscriptcommissie**

Prof. dr. Jan Buitelaar

Prof. dr. Pol van Lier (*VU*)

Prof. dr. Maja Dekovic (*UU*)

Prof. dr. Ronald Knibbe (*MU*)

Dr. Regina van den Eijnden (*UU*)

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# Chapter 1

## General introduction



## Problems concerning alcohol use in youngsters

Alcohol use has been attributed to significant health, social, and economic problems worldwide, being the world's third largest risk factor for disease and disability. Compared to adults, adolescents are even more vulnerable to the negative effects of alcohol use (World Health Organization, 2007). During adolescence, (heavy) drinking has been associated with negative consequences such as traffic accidents, violence, suicide, and risky sexual behaviors (Stolle, Sack, & Thomasius, 2009). Moreover, early alcohol use has been related to a higher risk of alcohol abuse or dependence later in life (Behrendt, Wittchen, Höfler, Lieb, & Beesdo, 2009; Englund, Egeland, Olivia, & Collins, 2008). Compared to other European countries, The Netherlands has a high percentage of alcohol-using adolescents and the adolescents drink large amounts of alcohol (Hibell et al., 2009). At the age of 12, 35% of the Dutch adolescents have at least tasted alcohol (Verdurmen, Monshouwer, et al., 2012). Knowledge on early risk factors and effective prevention strategies can provide fruitful avenues for decreasing alcohol use and its negative consequences among adolescents.

## Parents: How they matter

### Existing knowledge on the role of parents in children's alcohol use

In the literature on adolescent alcohol use, parental alcohol use and alcohol-related problems have been shown to be predictors of increased risk of early initiation and the intensity of alcohol use and problem drinking in later adolescence and adulthood (Alati et al., 2005; Blackson et al., 1999; Tildesley & Andrews, 2008; Van der Zwaluw et al., 2008; Van Zundert, Van der Vorst, Vermulst, & Engels, 2006; White, Johnson, & Buyske, 2000). Further, alcohol use of parents has been shown to be related to their parenting behaviors in general as well as their alcohol-specific parenting. For example, more parental alcohol use has been associated with less general monitoring and positive parenting (Tildesley & Andrews, 2008). Also, drinking parents tend to set less strict alcohol-specific rules and have less strict alcohol-specific attitudes (Van der Vorst, Engels, Meeus, & Dekovic, 2006; Van Zundert et al., 2006).

These alcohol-specific parenting practices have emerged from the literature as a unique factor explaining adolescent alcohol use above and beyond general parenting practices, such as support or control (Jackson, Henriksen, & Dickinson, 1999; Ryan, Jorm, & Lubman, 2010; Van Zundert et al., 2006). Several alcohol-specific strategies of parents to prevent their adolescent offspring from consuming alcohol have been examined, including alcohol-specific rule-setting and quality and frequency of alcohol-specific communication (e.g., Spijkerman, Van den Eijnden, & Huiberts, 2008; Van der Vorst, Engels, Meeus, Dekovi & Van Leeuwe, 2005). The most consistent predictor of adolescent alcohol use is alcohol-specific rules parents set for their children. Some cross-sectional studies suggest that alcohol-specific rules would be most effective in early adolescence to prevent both early onset and increase

in alcohol use (Koning, Engels, Verdurmen, & Vollebergh, 2010; Monshouwer, Smit, De Zwart, Spruit, & Van Ameijden, 2003). Other cross-sectional (Järvinen & Østergaard, 2009; Spijkerman et al., 2008; Van Zundert et al., 2006; Yu, 2003) as well as longitudinal (Martino, Ellickson, & McCaffrey, 2009; Van den Eijnden, Van de Mheen, Vet, & Vermulst, 2011; Van der Vorst, Vermulst, Meeus, Dekovi, & Engels, 2009; Van der Zwaluw et al., 2010) research stresses the importance of rule-setting during adolescence to prevent or diminish alcohol use. These findings on the importance of alcohol-specific rule-setting for adolescent alcohol use seem to be quite robust.

Besides rule-setting, adequate parent-child communication is generally thought of as a way for parents to prevent health-risk behaviors in their children (Riesch, Anderson, & Krueger, 2006). Regarding alcohol-specific communication, a distinction can be made between the frequency and the quality of communication about alcohol. Results on the associations between frequency of alcohol-specific communication and adolescent drinking have been mixed. Mostly, no association between frequency of alcohol-specific communication and adolescent alcohol use is found (Abar, Fernandez, & Wood, 2011; Ennett, Bauman, Foshee, Pemberton, & Hicks, 2001), with some studies presenting small positive associations for heavy-drinking males only (Van der Vorst, Burk, & Engels, 2010) or small negative associations (Miller-Day & Kam, 2010). What is often suggested to be of more importance to prevent adolescent alcohol use is the quality of these discussions. Until now, few studies provide evidence for the link between high quality of alcohol-specific communication and less adolescents' drinking (Koning, Van den Eijnden, Verdurmen, Engels, & Vollebergh, 2012; Spijkerman et al., 2008).

### Missing knowledge on the role of parents in children's alcohol use

As the short summary above indicates, knowledge on the role of parents in adolescents' alcohol use has increased extensively over the last decade. Despite the considerable amount of existing knowledge, some important gaps in the literature on how parents might affect adolescents' alcohol use remain. Below, we will first discuss what these gaps are. Based on these gaps and existing knowledge, we will provide a potential overarching framework and explain how the current thesis aims to complete this framework.

**Developmental perspective.** Alcohol use is an issue that becomes especially salient during adolescence, and as such, has been studied primarily during this age period and following developmental periods (Bauman & Phongsavan, 1999; Hawkins, Catalano, & Miller, 1992). Although adolescence is indeed the developmental period when alcohol use as an actual behavior becomes evident, it does not come out of nowhere. Children are exposed to alcohol in their environment from an early age, which will impact the formation of alcohol related cognitions. These cognitions, which are formed in childhood, can be seen as the precursors of actual drinking behaviors in adolescence.

From early on, alcohol cues and outcomes are present in the environment of children. For example, they observe their parents' drinking and related consequences, other adult

drinking at parties and in restaurants, alcohol advertisements on billboards, and alcohol use by actors on TV and in films. Therefore, it is not surprising that very young children are able to identify alcoholic beverages by smell or by seeing pictures of different beverages (Fossey, 1993; Noll, Zucker, & Greenberg, 1990; Zucker, Kincaid, Fitzgerald, & Bingham, 1995). Hence, young children are already aware of the existence of alcohol. Besides this mere awareness of the concept of alcohol, several studies have shown that, while children have had no real experience with actual alcohol use, they do hold implicit attitudes and outcome expectancies towards alcohol, at least from the age of seven years old (Dunn & Goldman, 1996; Noel & Thomson, 2012). What's missing in this body of research is knowledge on how parents affect alcohol-related cognitive sets in young children, even before these children start drinking. Although the link between parental alcohol use and child first experimentation with alcohol use has been confirmed during middle childhood and early adolescence (Donovan & Molina, 2008; Johnson, Greenlund, Webber, & Berenson, 1997), there have been very few studies (e.g. Dalton et al., 2005) examining the associations between parental alcohol use and various alcohol-related cognitions during childhood, before children initiate drinking.

After childhood, when children develop into adolescence, actual alcohol use often starts to develop (Verdurmen, Monshouwer, et al., 2012). At the same time, adolescents go through many developmental changes. An important developmental change during this period is that adolescents increasingly strive for autonomy and self-determination. As a result, this is a period in which parental influence slowly decreases (Gnaulati & Heine, 2001; Steinberg, 1990). As shown above, plenty of studies exist on the role of parents in adolescents' alcohol use. Since many of these studies are snapshots of specific age groups, a gap in this area is the lack of a developmental perspective on parents' influence from early adolescence to young adulthood. Research is needed that examines the predictive strength of alcohol-specific parenting over the entire course of adolescence, providing an overview of the changes in alcohol use and in parenting during this period of change.

**Child cognitions as mediators.** Despite the fact that research on alcohol-specific parental factors has rapidly expanded over the last decade, not much is known about the underlying processes that account for the transference of these parenting behaviors to the actual alcohol use of adolescents. Since situations that potentially involve adolescent alcohol use often do not involve the presence of parents, there must be an intervening factor that transfers the alcohol-specific parenting practices in the at-home context to adolescent alcohol use behaviors in outside-the-home contexts. According to Bandura's social cognitive theory, the link between one's environment (parenting) and one's actions (alcohol use) can be explained by an individual's self-regulatory system (Bandura, 1986) or internal working model (Bretherton, 1999). More specifically, when a child interacts with his or her environment, it develops certain schemes to apprehend the world. These schemes or this system include the ideas or cognitions individuals have concerning alcohol, and will eventually be internalized by the child. However, studies on how the associations between



alcohol-related parent behaviors and adolescent alcohol use are mediated through adolescent or child cognitions towards alcohol are limited (Campbell & Oei, 2010; Watkins, Howard-Barr, Moore, & Werch, 2006).

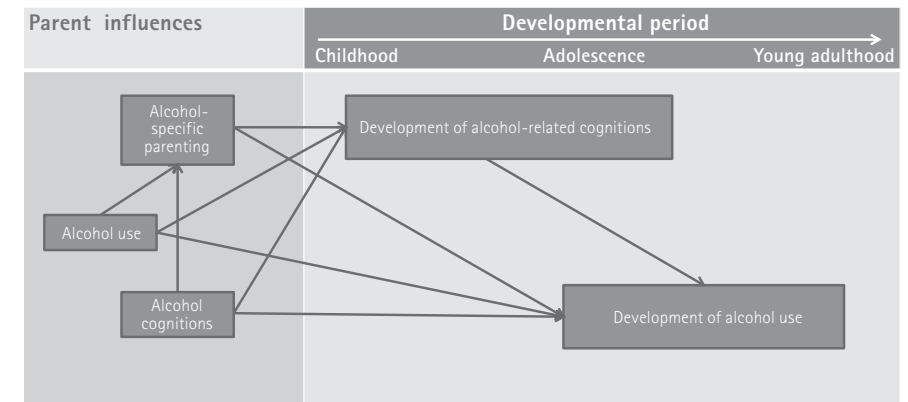
**Parent cognitions as predictors.** An extension of the mechanism by which parents can influence their children's alcohol use has been provided by Campbell and Oei (2010), who have proposed that besides a link between parent behaviors and child cognitions, also direct transgenerational transference of alcohol cognitions (i.e., motives, attitudes, norms and expectancies) occurs. In other words, there is not only an indirect link between parental alcohol use and adolescent or young adult alcohol use through child's cognitions, but also an indirect link from parental alcohol *cognitions* to adolescent alcohol use through child's cognitions. While some studies show that alcohol-related norms or attitudes of parents and children are related (Brody, Flor, Hollett-Wright, & McCoy, 1998; Parsai, Voisine, Marsiglia, Kulis, & Nieri, 2009), others reveal no link between parent and child alcohol expectancies (Handley & Chassin, 2009; Campbell & Oei, 2010). Given these inconclusive results, extended research on the associations between parent cognitions and child cognitions and behaviors is warranted.

### The knowledge this thesis aims to add

We propose a framework on which the different studies in the current thesis are based. In this framework, which is presented in Figure 1, parental alcohol use, alcohol-specific parenting and parent alcohol-related cognitions serve as antecedents of alcohol-related cognitions and alcohol use in their offspring. In light of a developmental perspective, the child factors that are being predicted depend on the specific developmental period in the child's life. Below, we will describe how the chapters in this thesis will aim to add to the existing knowledge in relation to this framework.

Chapters 2 and 3 of this thesis focus on the link between parental alcohol use and the development of alcohol-related cognitions during childhood. Literature on the link between parental alcohol use and children's alcohol-related cognitions did show that more parental alcohol use is associated with more positive or arousal expectancies in children from the age of eight years and older and that these expectancies exist even before children start drinking alcohol themselves (Martino, Collins, Ellickson, Schell, & McCaffrey, 2006; Noel & Thomson, 2012; Pieters, Van der Vorst, Engels, & Wiers, 2010). When children are as young as six months old, preferences for toys and beverages with the smell of alcohol are already associated with parental alcohol use (Mennella & Beauchamp, 1998; Mennella & Garcia, 2000). Also, children (two-six years old) of drinking parents are more likely to buy alcoholic drinks during pretend play (Dalton et al., 2005). These findings provide an indication that parents' alcohol use might be related to cognitions regarding alcohol in the early stages of life. Since there has been a lack of studies linking cognitions such as alcohol associations, expectancies, or willingness to drink to parental alcohol use in young children, chapter 2 will focus on the association between parental alcohol use and pretend alcohol use in children

**Figure 1** Proposed framework on parenting and alcohol use.



aged four to six. Following, chapter 3 will examine whether parental alcohol use is related to outcome expectancies, measured in a more explicit manner in a slightly older sample of children aged six to nine.

Chapters 4 and 5 of the current thesis aim to provide more insight into the mechanism by which parenting behaviors relate to the early stages of alcohol use in children. Many studies showed that memory associations (Ames, Sussman, Dent, & Stacy, 2005; Stacy & Newcomb, 1998; Thush et al., 2007), outcome expectancies, and drinking refusal self-efficacy (Aas, Klepp, Laberg, & Aarø, 1995; Connor, George, Gullo, Kelly, & Young, 2011; Lee & Oei, 1993; McKay, Sumnall, Goudie, Field, & Cole, 2011) are important cognitions determining individuals' drinking behaviors. The mediating mechanism between parenting and child behaviors through these cognitions has been confirmed in other areas such as adolescent smoking (Harakeh, Scholte, Vermulst, & Engels, 2004; Hiemstra, Otten, Van Schayk, & Engels, 2012; Huver, Engels, & De Vries, 2006; Otten, Harakeh, Vermulst, Van den Eijnden, & Engels, 2007). Some preliminary studies on how the associations between alcohol-related parent behaviors and adolescent alcohol use are mediated through adolescent cognitions towards alcohol showed that the link between parental alcohol use, parental monitoring, and adolescent alcohol use were mediated through adolescent cognitions (Campbell & Oei, 2010; Watkins et al., 2006). Chapter 4 aimed to extend these findings by using a more implicit measure of adolescent alcohol cognitions – memory associations. In chapter 5, we aimed to provide more insight into the associations between important alcohol-specific parenting practices and adolescent alcohol use, and whether these associations were mediated through adolescent outcome expectancies and self-efficacy.

Once adolescents have started drinking, it is known that this can quickly result in regular or even excessive alcohol use during late adolescence (Gruber, DiClemente, Anderson, & Lodico, 1996; Verdurmen, Monshouwer, et al., 2012). Chapters 6 and 7 of this



thesis center around the role of parent cognitions in the prediction of more problematic alcohol use behaviors among adolescents. In chapter 6, we first examined whether parental alcohol use and their attitudes towards adolescent alcohol use could predict their alcohol-specific communication patterns, which might shed further light on the ambiguous findings on alcohol-specific communication. Chapter 7 focused on the intergenerational transmission of drinking motives, since these are the most proximal predictors of different drinking patterns (Cooper, 1994; Ham, Zamboanga, Bacon, & Garcia, 2009; Kuntsche, Knibbe, Gmel, & Engels, 2005). The intergenerational transmission of drinking motives has been investigated by one study (Windle and Windle, 2012), which only examined motive-specific associations and did not take into account adolescent alcohol use behaviors. In chapter 7, we examined whether parent motives were related to adolescent motives, and whether these adolescent motives were predictive of their drinking behaviors.

To complete the developmental perspective on the role of parents in adolescent alcohol use behaviors, chapter 8 aimed to provide an overview of the entire period from early adolescence to young adulthood. As mentioned before, this is a period in which adolescents increasingly strive for autonomy and self-determination, which might affect parental influence (Gnaniati & Heine, 2001; Steinberg, 1990). Although the link between alcohol-specific rule-setting and adolescent alcohol use has been consistently shown in different age groups, we examined the strength of this association over time with a longitudinal design in chapter 8.

## Alcohol prevention

### What is known about effective prevention?

As shown above, ongoing research has resulted in increasing knowledge on the risks related to early onset of alcohol use and the risk factors associated with alcohol use during adolescence. In order to use the knowledge on adolescent alcohol use in prevention efforts, the existing knowledge was combined with knowledge on effective prevention strategies. When thinking of effective prevention strategies, several factors should be taken into account, such as determining the target population and program characteristics (Nation et al., 2003). With regard to the target population it is suggested that, since programs should be developmentally relevant to the participants, and should be implemented when participants are not yet exhibiting the unwanted behavior, the period when children transition out of elementary school might be an important window for intervention (Nation et al., 2003). Indeed, when considering alcohol use statistics among Dutch adolescents in 2009 (Van Dorsselaer et al., 2010), it became apparent that many children start experimenting with alcohol in their first years at secondary school. Despite these numbers, Dutch prevention efforts targeting parents and their children during this transition period between elementary and secondary school have been lacking. This resulted in the need to develop an

alcohol prevention program for elementary school children who are about to transition to secondary school.

When targeting children in elementary school, it is important to take into account the many studies providing evidence for the significant effect parents can have on their children's alcohol use behaviors, even when compared to for example peer influences (Duncan, Tildesley, Duncan, & Hops, 1995; Van der Vorst et al., 2005; Van der Vorst et al., 2009). Therefore, when trying to prevent these youngsters from initiating or increasing alcohol use, it seems to make sense to not only target these children, for example in the school setting, but also target their parents in an at-home setting. Indeed, among different alcohol prevention programs, those that included parents appeared to be most effective (Koning et al., 2009; Koutakis, Stattin, & Kerr, 2008; Smit, Verdurmen, Monshouwer, & Smit, 2008; Stigler, Perry, Komro, Cudeck, & Williams, 2006). Most of the parent components of these programs merely include the provision of information to parents, be it in writing or during parent meetings at school. None of the programs targeting parents and children in this age range enabled or empowered parents to have discussions concerning alcohol with their children. While the strategy of providing information has proven to result in positive effects for some of these programs, it is emphasized that interactive programs components result in larger effects (Nation et al., 2003). Therefore, in the present thesis, we aimed to assess the effectiveness of an interactive alcohol prevention program for elementary school children (11-12 years old) and their parents, which can be completed in a private home setting (Chapters 9, 10, 11, and 12).

### In Control: No alcohol!: Theoretical basis of the program

The alcohol prevention program we tested in the present thesis was based on a smoking prevention program that has proven to be effective in the United States (Jackson & Dickinson, 2006). The program design was structured around two theories to meet the prevention objectives: Social Cognitive Theory and models of persuasive communication for attitude and behavior change. Fundamentals of child socialization were derived from Bandura's Social Cognitive Theory (Bandura, 1986) and consisted of perception, cognitive rehearsal, behavioral rehearsal, and motivation. Every part of the program addressed one or more of these child socialization processes. The Elaboration Likelihood Model (Petty & Cacioppo, 1986) contributed to the design of persuasive communication. This model states that participants can differ in the degree to which they experience the program being relevant or obvious. While designing the prevention content and layout, this was taken into account. Other theory-based program design strategies used include: free choice regarding when and how to implement program objectives; promote gradual change in socialization activities; dedicate part of the prevention to developing requisite skills, such as parent-child communication skills, needed to implement other program recommendations; use multiple reinforcers to maintain involvement and motivation; build on existing alcohol-specific socialization literature (e.g. effectiveness of alcohol-specific rules).

### In Control: No alcohol!: The program

The proposed program, "In control: No alcohol!", consists of five modules which families received by mail every four weeks for a period of five months. A module consists of an attractive magazine including information, games, quizzes, and puzzles for parents and children to complete together. These structured interactions for the parent and child are a key technique for facilitating parent-child engagement in the program. Each of the five magazines addresses different important issues regarding youth alcohol use and child socialization. In addition to these specific topics, each magazine contains general information and practical tips on high-quality parent-child communication in order to gradually increase parents' skill and comfort level in communicating with their children about alcohol. In addition with the first magazine the child received a personalized activity book ("Logboek"). The activity book provides the child with the opportunity to repeat what he/she learned about alcohol in a playful and personal way. It is also an extra stimulus to be active in the program. With the activity book, each child received a personal login code for the related secured website ([www.houvolgeenalcohol.nl](http://www.houvolgeenalcohol.nl)). The login code provides access to more games, puzzles and pictures related to the prevention program. The child could download the completed website activities and put them in his/her activity book, so he/she could create his/her own glossy journal.

### How the program was tested

Chapters 9 and 10 of this thesis describe the results of a pilot RCT study aimed to examine the preliminary effects of the program. After designing the program, a pilot study was conducted to assess whether the program would be well received and implemented by mothers and their children. Further, both a control group and an experimental group participated in the pilot study, in order to examine whether there would be difference between the control and experimental group in the putative mediators of the program – alcohol-specific parenting practices and child alcohol cognitions.

Following, a randomized controlled trial was set up to assess program effects on children's alcohol initiation. In accordance with the CONSORT statement (Moher et al., 2010), a study protocol was published before the start of the trial, explaining the trial design and main and secondary outcome measures (Chapter 11). In chapter 12 of the thesis, the effect of the program on the main outcome measure – alcohol initiation – was assessed. Also, possible subgroup effects were assessed across gender and maternal alcohol use patterns. Last, an appendix was added in which results of additional analyses on secondary outcome measures were reported.

### Aims and set-up of this thesis

The current thesis consists of two parts, which correspond to the two-sided aim of the thesis. First, it aimed to examine several risk or protective factors in alcohol-related trajectories from childhood to young adulthood. These risk or protective factors concern the parental (i.e. parental alcohol use, alcohol-specific parenting, and alcohol-related cognitions) as well as the individual domain (alcohol-related cognitions). The seven studies addressing these issues comprise the first part of the thesis. Second, this thesis aimed to study the effectiveness of an alcohol-prevention program for six grade elementary school children and their mothers. In the second part of the thesis, there are four chapters describing the prevention program and the results concerning the effectiveness of the prevention program. To reach these two goals of the thesis, different datasets were drawn on, of which an overview is provided in Table 1.

**Table 1** Characteristics of the datasets included in the present thesis

Chapters	Design	Method	Participants	Sample size
2	Observational-experimental study	Interviews and role-plays at school	Children aged 4-6	119
3	Longitudinal study	Interviews and paper-and-pencil questionnaires	Children aged 6-9	240
4	Longitudinal study	Paper-and-pencil questionnaires at school	Adolescents aged 11-17	608
5, 11, 12	Longitudinal RCT	Internet surveys at home	Children aged 10-14	1349
6, 7, 8	Longitudinal study	Paper-and-pencil questionnaires at home	Adolescents aged 14-17 and their younger siblings aged 13-15.	428
9, 10	Longitudinal RCT	Internet surveys at home	Children aged 10-13	218

### Part 1. Risk factors in alcohol use from childhood to young adulthood

The study presented in *chapter 2* aimed to gain insight into the ideas young children have concerning alcohol use and whether parental alcohol use is related to these ideas. Pretend alcohol use in a play situation in which children were asked to act as if they were grown-ups celebrating their birthday was used as an indirect measure to assess alcohol

attitudes. We tested whether children would be more likely to pretend to use alcohol during their play when they perceived their parents to use more alcohol.

The study aim in *chapter 3* was similar to that of chapter 2, the difference being that in this study we assessed alcohol attitudes in somewhat older children by asking them directly about these attitudes using a child appropriate interviewing technique. We examined whether parental alcohol use was related to these alcohol expectancies in young children and whether there were differences in these associations by age and gender.

The findings of chapters 2 and 3 were extended in *chapter 4* by not only providing insight into the link between parental alcohol use and child attitudes, but also exploring whether these child attitudes were related to alcohol initiation. To assess alcohol attitudes, young adolescents were surveyed on the number of memory associations they reported. It was tested whether these memory associations mediated the relation between parental alcohol use and adolescent alcohol initiation.

In *chapter 5* we tested whether the mediating effect of adolescent alcohol attitudes or cognitions found in chapter 4 also holds for the relation between alcohol-specific parenting practices and adolescent alcohol use. It was examined whether parental alcohol use, alcohol-specific rules and different aspects of alcohol-specific communication were related to adolescent alcohol use. Moreover, the mediating effects of drinking refusal self-efficacy, and positive and negative alcohol-related outcome expectancies were examined.

A first exploration into the interplay between parent alcohol use, parent alcohol cognitions and alcohol-specific parenting in predicting adolescents' heavy drinking was embarked upon in *chapter 6*. Specifically, it was tested whether parental alcohol use, their related problems, and parents' attitudes towards drinking among adolescents were predictive of parent-child alcohol-specific communication. Further, it was tested whether alcohol-specific communication was predictive of adolescents' excessive drinking and its related problems.

Parent cognitions concerning alcohol were further examined in *chapter 7*, however, this time also in relation to adolescent cognitions concerning alcohol. In a sample of drinking young adults, we explored whether parental drinking motives were associated with young adult drinking motives, even when controlling for parental alcohol use. Further, it was tested whether adolescent drinking motives were predictive of their normative alcohol use and their reports of alcohol-related problems.

Chapters 2-7 provided insight into the associations between alcohol-specific parenting and adolescent alcohol use among different age groups across adolescence/young adulthood. To conclude part 1 and to provide a developmental overview of the association between alcohol-specific parenting and adolescent alcohol use, *chapter 8* describes a study in which the effect of alcohol-specific rules set by parents on adolescent alcohol use was examined from early adolescence to young adulthood.

## Part 2. In control: No alcohol!: Effectiveness of an alcohol prevention program

Chapters 9 and 10 describe the results of a pilot study into the possible effectiveness of the alcohol prevention program. First, in *chapter 9* it was tested whether participants in the experimental group reported higher on alcohol-specific rules and communication, monitoring, and whether they more often set up a non-drinking contract. Also, moderation effects of maternal alcohol use and alcohol-related problems were examined. These results were followed up in *chapter 10*, in which we sought to determine whether the parenting factors tested in chapter 9 acted as mediators in the possible program effect on adolescents' perceived harmfulness of drinking and intention to drink. Further, potential differences across gender were examined.

In *chapter 11*, an elaborate description of the study as well as the program design of a large randomized controlled trial is provided. *Chapter 12* contains the results of the program effects on the main outcome, adolescents' initiation of alcohol use, defined as drinking at least one glass of alcohol. Potential differences across gender and maternal alcohol use patterns were examined. Part 2 is concluded by an *appendix*, shortly summarizing the results of the program effects on the secondary outcomes such as alcohol-specific rules and communication and adolescent cognitions en intention to drink.

A summary and general discussion of the main finding from this thesis is presented in *chapter 13*. Limitations of this thesis are addressed, and implications of the findings are discussed, in relation to future research as well as practice.

# Part 1

Risk factors in alcohol use  
from childhood to young adulthood



## Chapter 2

### Parental alcohol use and pretend alcohol use in young children



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## Abstract

Children tend to get acquainted with alcohol long before they start to drink themselves. Understanding of the predictors and timing of alcohol-related scripts in children could inform alcohol prevention strategies. The aim of this study was to examine whether child-reported parental alcohol use was associated with alcohol-related pretend play in young children. Between October 2012 and January 2013, children were asked to pretend they were grown-ups celebrating their birthday. A research assistant observed each session. After their play, children were interviewed. This study was conducted at eight primary schools in the Netherlands. 360 parents were approached to ask consent for their children to participate in the study. The final sample consisted of 119 children between four and six years of age ( $M = 4.97$ ,  $SD = .79$ ) of whom 54.6% were boys. The majority of the children were born in the Netherlands (96.6%). Children that were not included in the study were those of which parents or children refused or that did not meet the age range of four to six years. The primary outcome measure was whether or not a child pretended to drink alcohol, which was coded as positive when they poured themselves a glass of alcohol. When children just put the bottles of alcohol on the table or poured a glass of alcohol for someone else, pretend alcohol use was coded negative. Results showed that the adjusted odds for children pretending to use alcohol during their play were approximately 3.5 times higher if children indicated having mothers that drank alcohol versus mothers that did not drink alcohol ( $OR = 3.73$ ,  $CI = 1.26 - 11.06$ ). No significant effects for paternal alcohol were found. The present study showed that children were more likely to pretend to use alcohol in a play situation when they perceived their mothers to drink alcohol more often compared to when they perceived their mothers to drink less often. Results of this study indicate that it might be important to make parents aware of how their alcohol use behaviors are related to alcohol-related behaviors in even very young children.

## Introduction

Children tend to get acquainted with alcohol long before they start to drink themselves. For example, babies of alcohol using parents already show preferences for toys and beverages with the smell of alcohol when they are as young as six months old (Mennella & Beauchamp, 1998; Mennella & Garcia, 2000). Moreover, children are already able to identify different alcoholic beverages from the age of three (Fossey, 1993; Zucker et al., 1995). According to several theories, such as attachment and psychoanalytic theory (Bretherton, 1999; Stern, 1985), children will process their environment and the behaviors they observe and consequently create their own ideas and representations of these behaviors, so-called internal working models. As a result, these internal working models are hypothesized to guide future behaviors of children. Understanding of the formation process and timing of these internal working models could inform alcohol prevention strategies. To our knowledge, few studies have examined the interplay between alcohol in children's direct environment and whether alcohol is represented as a probable behavioral option in young infants.

Some exploration into the existence of alcohol schemas during late childhood has been undertaken. Research showed that alcohol expectancies exist in children from the age of six years old (Miller, 1990), and that these expectancies exist even before children start drinking alcohol themselves (Noel & Thomson, 2012). Further, several studies have shown that these expectancies are dependent on parental alcohol use behaviors, at least for children ten years and older (Martino et al., 2006; Pieters et al., 2010). Specifically, these studies showed that more parental alcohol use has been associated with more positive or arousal expectancies in children. The only known exploration of the association between parental alcohol use and alcohol schema in children below the age of six years is a study which showed that children of alcoholic parents were better able to identify different alcoholic beverages and identify for whom alcohol is an appropriate beverage (Zucker et al., 1995).

Part of the reason why these studies in young infants are lacking may be the difficulty to assess young infant's attitudes towards alcohol use. Since children under the age of six years have limited language abilities, are extremely susceptible to the social desirability bias, and might not always be aware themselves of what they know and think (Einarsdóttir, 2007), standard methods such as interviews and questionnaires are not suitable. To overcome these methodological challenges with regard to young infants and measuring their substance-related cognitions, a few recent studies developed play situations in which children were given the opportunity to represent and practice their substance-related internal working models (Dalton et al., 2005; De Leeuw, Engels, & Scholte, 2010). Dalton et al. (2005) showed that children of drinking and smoking parents were more likely to buy alcohol and cigarettes at a grocery shop. Since these children were asked to shop for a social evening, this would indicate whether children think alcohol and cigarettes are appropriate in social situations. Further, another study in which children were asked to act out a dinner situation, demonstrated that children of smoking parents are more likely to



pretend to smoke themselves (De Leeuw et al., 2010). Actually pretending to use alcohol in relevant social situations has not yet been examined. The present study is the first to examine whether children are also likely to pretend to drink alcohol in a relevant social situation such as a birthday party, shedding light on those internal working models that are most likely to guide actual future alcohol use behaviors of children.

Research that examines the effect parental alcohol use might have on their children differs in whether it uses child or parent reports on parental drinking. Smith, Miller, Kroll, Simmons, and Gallen (1999) revealed that, especially when younger children are asked about their parent's drinking behaviors, shared variance between parent and child reports is fairly low. This makes sense, since many occasions in which parents drink alcohol would be in the absence of their children. Therefore, the authors suggest that studies of alcohol modeling influences on children should assess children's perceptions of their parent's behaviors. Also, a study of Yu (2003) showed that parental reports of alcohol use are related to children's drinking, but only when combined with the amount of time children spend with their parents, arguing for the inclusion of child reports. Therefore, we examined whether child-reported parental alcohol use was associated with alcohol-related pretend play in young children. Children were asked to pretend that they were grown-ups and to act out celebrating their birthday. We hypothesized that children with parents that drank alcohol more often would be more likely to pretend to use alcohol during their play. Given the previously shown differences in associations between parental alcohol use and child alcohol cognitions for mothers versus fathers (Handley & Chassin, 2009; Pieters et al., 2010), these hypotheses were tested separately for maternal and paternal alcohol use.

## Method

### Sample and Procedure

This study was conducted at eight primary schools in the Netherlands. After gaining consent from the head masters of the schools to participate, parents of the children in the first three classes (i.e., the nursery classes and the first grade) received a letter with a description of the study, of which 38% gave active consent. It was emphasized that all information would be treated as strictly confidential. After obtaining written parental consent, children were excused from class and individually tested. Children were invited to play in the play corner with a toy kitchen and a child-sized seating area (see Figure 1). At the table, there was a birthday cake. Further a large number of kitchen-related toys and several snacks and beverages – including fake beer, wine, and champagne – were available to create a setting as realistic as possible. All materials were placed in the same position for all children. Children were asked to pretend they were grown-ups in their own house celebrating their birthday. A research assistant observed each session while sitting on a chair at a distance from the play corner. After their play, children were interviewed by the

Figure 1 Play corner.



research assistant. After completing the interview, children received a leaf of stickers and were accompanied back to the classroom. The sample consisted of 119 children between four and six years of age ( $M = 4.97$ ,  $SD = .79$ ) of whom 54.6% were boys. The majority of the children were born in the Netherlands (96.6%). Data collection took place between October 2012 and January 2013. The ethical committee of the Faculty of Social Sciences, Radboud University Nijmegen approved this study.

### Measures

**Child's pretend alcohol use.** The primary outcome measure was whether or not a child pretended to drink alcohol. This measure was derived from an earlier study on pretend smoking and showed good reliability (De Leeuw et al., 2010). Children's pretend alcohol use was coded as positive when they poured themselves a glass of alcohol. When children just put the bottles of alcohol on the table or poured a glass of alcohol for someone else, children's pretend alcohol use was coded as negative.

**Parental alcohol use.** Children were asked whether their parents drink alcohol, separately for their fathers and mothers. Response options were 1 = *no*, 2 = *sometimes*, 3 = *yes, every day*.

### Strategy of Analyses

First, descriptive statistics of model variables were calculated. Chi-square and t-tests were performed to determine any differences between those children who pretended to use alcohol versus those who did not. To examine whether parental alcohol use predicted children's pretend alcohol use, we conducted a logistic regression analysis with the child

reports of parental alcohol use as a predictor and pretend alcohol use as an outcome variable. In this analysis, we adjusted for the child's sex and age.

## Results

### Descriptive Statistics

Descriptive statistics and *t*-tests for child and parent characteristics are presented in Table 1. *T*-tests revealed a significant age difference between children that did and did not pretend to use alcohol. Children that did pretend to use alcohol were, on average, older compared to children that did not pretend to use alcohol. Also, findings revealed that children that did pretend to use alcohol reported that their mothers used alcohol more often compared to children that did not pretend to use alcohol. All other variables did not differ between children that did and did not pretend to use alcohol.

**Table 1** Descriptive statistics and difference tests for child and parent characteristics by pretend smoking

	Total (N=119)	Pretend alcohol use (N=33)	No pretend alcohol use (N=86)	Difference <i>t</i> ( <i>p</i> )
<i>Prevalence</i>				
Female sex	45.4%	45.5%	45.3%	.01(.99)
Maternal alcohol use				-2.29(.03)
No	35.6%	18.2%	42.4%	
Sometimes	58.5%	75.8%	51.8%	
Every day	5.9%	6.1%	5.9%	
Paternal alcohol use				.20(.85)
No	11%	12.1%	10.6%	
Sometimes	70.3%	69.7%	70.6%	
Every day	18.6%	18.2%	18.8%	
<i>Mean (standard deviation)</i>				
Child's age	4.97(.79)	5.27(.67)	4.86(.80)	-2.62(.01)

### Parental Alcohol Use and Pretend Alcohol Use

Logistic regression analyses were performed to test the association between parental alcohol use and children's pretend alcohol use. As illustrated in Table 2, results show that child-reported maternal alcohol use was significantly related to children's pretend alcohol use. The adjusted odds for children pretending to use alcohol during their play were approximately 3.5 times higher if children indicated having mothers that drank alcohol versus mothers that did not drink alcohol. Child's age was significantly related to children's pretend alcohol use, with older children having higher odds to pretend to use alcohol during their play. In additional analyses, it appeared that age did not moderate the association between parental alcohol use and children's pretend alcohol use.

**Table 2** Logistic regression explaining children's pretend alcohol use

	OR( <i>p</i> )	95% CI
<i>Unadjusted model</i>		
Child's sex <sup>a</sup>	1.00(.99)	.45 – 2.23
Child's age	2.01(.01)	1.17 – 3.47
Maternal alcohol use		
No (reference group)	1.00	
Sometimes	3.41(.02)	1.26 – 9.21
Every day	2.40(.36)	.38 – 15.32
Paternal alcohol use		
No (reference group)	1.00	
Sometimes	.86(.82)	.24 – 3.08
Every day	.84(.83)	.19 – 3.80
<i>Full model</i>		
Child's sex <sup>a</sup>	1.12(.75)	.48 – 2.63
Child's age	2.04(.02)	1.17 – 3.55
Maternal alcohol use		
No (reference group)	1.00	
Sometimes	3.73(.02)	1.26 – 11.06
Every day	2.67(.32)	.39 – 18.38
Paternal alcohol use		
No (reference group)	1.00	
Sometimes	.48(.31)	.12 – 1.98
Every day	.51(.43)	.10 – 2.70

Note. OR = Odds Ratio; 95% CI = 95% Confidence Interval; <sup>a</sup> 1 = girl and 2 = boy.

## Discussion

The present study examined the associations between paternal and maternal alcohol use and children's pretend alcohol use during a play situation in which they were asked to pretend to celebrate their birthday as adults. Results showed that almost 30% of the children pretended to use alcohol. Older children were more likely to pretend to use alcohol compared to younger children. This is in accordance with previous studies indicating that children's attitudes towards alcohol become more positive when children get older (Donovan, Molina, & Kelly, 2009; Dunn & Goldman, 2000; Hipwell et al., 2005; Noel & Thomson, 2012). Further, children were more likely to 'use alcohol' when they reported that their mothers drank more often. This finding supports the assumption that based on what they perceive in their environment, children form internal working models regarding alcohol use (Bretherton, 1999). Through observing their mother's drinking behaviors, children learn that it is normative to drink alcohol in certain situations, for example, at a birthday party. Consequently, children likely internalize these norms, which are likely to guide their future behaviors. The present study showed that young infants (aged 4–6 years) of frequently alcohol using mothers are more inclined to act out alcohol use behaviors. Since the children were asked to act as if they were an adult, this could be viewed as an intention of the child to use alcohol when they grow up. In line with findings by Dalton et al. (2005), the present study showed that young infants that perceive their mothers to use alcohol are already at increased risk for alcohol-related behaviors, at least in a play setting.

The present study exclusively showed an association between maternal alcohol use and children's pretend play, and not between paternal alcohol use and children's pretend play. Previous studies showed mixed results with regard to paternal and maternal alcohol use effects on children's (or adolescents') alcohol use (Mares, Van der Vorst, Engels, & Lichtwark-Aschoff, 2011; Poelen, Scholte, Willemsen, Boomsma, & Engels, 2007) and because of high coherence between paternal and maternal drinking, many studies use a composite measure (Dalton et al., 2005; Van der Vorst et al., 2012). Therefore, it is difficult to draw definite conclusions on the difference in association between maternal and paternal alcohol use and children's behaviors. Perhaps the fact that we asked children to report on their parent's alcohol use might play a role. Mothers are known to drink less alcohol compared to fathers (Van Laar et al., 2011) and mothers are less likely than fathers to drink alcohol in front of their children (Verdurmen, Smit, Van Dorsselaer, Mosnhouwer, & Schulten, 2008). Therefore, when children perceive their mothers to drink alcohol, it might be more distinct compared to perceived paternal alcohol use. Also, the specific situation of a birthday party, which children were asked to play out, might have accounted for the difference in effects for mothers and fathers. Fathers are more likely to consume alcohol on a daily basis, for example during dinner situations, while mothers are less likely to be daily drinkers and might therefore be more likely to consume alcohol at special occasions such as a birthday party. The specific study situation of a birthday party might have result in a larger

modeling effect of maternal alcohol use on children's pretend alcohol use compared to paternal alcohol use.

Some limitations of this study should be acknowledged. In contrast with a previous study examining the association between parental smoking and children's pretend smoking (De Leeuw et al., 2010), we only examined the associations between child reports of parental alcohol use and children's pretend play. However, as mentioned before, child perceptions of parental alcohol use might be more important to measure given the limited shared variance between parent and child reports (Smith et al., 1999). Future studies could use multi-informant reports to determine which reports might be more reliable and to determine whether parents might underreport their alcohol use, as is the case with smoking behaviors (Gorber, Schofield-Hurwitz, Hardt, Levasseur, & Tremblay, 2009). Second, to avoid affecting parent and child behaviors concerning alcohol use and due to the short time frame of data collection, parent and child questionnaires were administered after child play was observed. However, this prevented us from drawing any firm conclusions about causality, i.e. whether parental alcohol use was a precursor of play behavior of the child. In future studies, parent behaviors should be assessed before child behavior will be observed. To avoid affecting these behaviors, there should be an extended period of time between questionnaires and observations. Further, while the current study did examine a form of implicit alcohol-related attitudes in children, and these have been shown to be predictive of later alcohol use behaviors (Pieters et al., 2010; Van der Vorst et al., 2012), it is not known whether children's pretend play behaviors will be predictive of actual alcohol use. Therefore, it is essential to use prospective designs to examine the predictive validity of the currently used implicit measure.

Concluding, the present study showed that children were more likely to pretend to use alcohol in a play situation when they perceived their mothers to drink alcohol more often compared to when they perceived their mothers to drink less often. This is an indication that already in early childhood, alcohol-related internal working models are constructed based on the behaviors children observe in their (immediate/family) environment. In research regarding effects of parental alcohol use on young children, it is important to also collect child reports on parental alcohol use, since parent reports also include drinking occasions where children are absent. Apparently, it is especially the child's perception of parental alcohol use that is related to their own behavior. Results of this study indicate that it might be important to make parents aware of how their alcohol use behaviors are related to the development of alcohol-related scripts in even very young children.

## Chapter 3

Alcohol expectancies in  
young children and how this relates  
to parental alcohol use



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## Abstract

According to the cognitive model of intergenerational transference, modeling of alcohol use is an indirect process in which parental drinking shapes alcohol expectancies of children, which in turn are associated with later alcohol use in adolescents. The present study examined whether parental alcohol use was already related to alcohol expectancies and experimentation with alcohol use in young children. A community sample of 240 children aged 8.02 ( $SD = 1.13$ ) participated. Alcohol expectancies were assessed by means of the Berkeley Puppet Interview. Children reported consistently and reliably on the positive and negative consequences of alcohol use among adults. Their positive and negative expectancies were equally strong. Compared to younger children, older children had more negative and less positive expectancies. For girls, more paternal alcohol use was associated with less negative alcohol expectancies. For older children, more alcohol use of the mother was related to less positive expectancies, while more alcohol use of the father was related to more positive expectancies. The present study showed that young children already have clear ideas about the positive and negative consequences alcohol can have among adults, which can be captured with the Berkeley Puppet Interview. These expectancies are partly associated with alcohol use of their parents.

## Introduction

Problems concerning alcohol use in (young) adults are for a great deal attributable to the presence of the same problems in one or both of their parents (Cuijpers, Langendoen, & Van Bijl, 1999; Sher, Grekin, & Williams, 2005). This intergenerational transmission of alcohol use is rather consistent. Already in fairly young children (8 years and older) the link between parental alcohol use and child experimentation with alcohol use has been confirmed (Donovan & Molina, 2008; Johnson et al., 1997). Also, the link between parental alcohol use and alcohol use of their offspring has been shown throughout adolescence (Alati et al., 2005; Duncan, Duncan, & Strycker, 2006; Van der Zwaluw et al., 2008; White et al., 2000). The cause of this similarity has been attributed to several factors, such as genetic and environmental, and a combination of these two (Biederman, Faraone, Monuteaux, & Feighner, 2000; Irons, Iacono, Oetting, & McGue, 2012). Since understanding the environmental family circumstances are essential to be able to change child and adolescent drinking preferences and behaviors, unraveling the environmental link is an important avenue of research.

Derived from social learning theory, modeling has long been an important explanatory mechanism (Bandura, 1986). Building on this work, this and other cognitive theories, such as the Alcohol Expectancy Theory, have suggested that modeling is probably an indirect process (Campbell & Oei, 2010; Pajares, 1997; Zimmer-Gembeck & Collins, 2006). Some refer to this indirect process as a cognitive model of intergenerational transference (Campbell & Oei, 2010), while others refer to this as delayed modeling (Bandura, 1986). Both theoretical frameworks state that children will not immediately adopt the behaviors they see from others, for example their parents. There will be an extended period of time between the observed behaviors and the actual modeling of these behaviors. During this period of time, children will process the behaviors they observe and create their own ideas and representations of these behaviors, so-called internal working models (Bretherton, 1999). Consequently, these internal working models are hypothesized to guide future behaviors of children.

According to social cognitive theory, such internal models partly consist of outcome expectancies (Pajares, 1997), for example the expectancies children have about the effects alcohol use can have on people. Evidence for alcohol-related expectancies as a possible intervening factor between parental and child alcohol use can be found in studies that have shown that these expectancies are dependent on parental alcohol use behaviors (Martino et al., 2006; Pieters et al., 2010). That is, more parental alcohol use has been associated with more positive or arousal expectancies in children. Further, previous research has shown that these expectancies exist even before children start drinking alcohol themselves (Noel & Thomson, 2012), and that they are related to adolescent actual alcohol use (Anderson, Grunwald, Bekman, Brown, & Grant, 2011; Larsen, Engels, Wiers, Granic, & Spijkerman, 2012) and even predict future changes in adolescents' alcohol use behaviors (Bekman, Anderson,



et al., 2011). Taken together, these studies provide evidence for the cognitive model of inter-generational transference, in which the link between parental and child alcohol use might be explained through the formation of alcohol-related expectancies.

What does not appear from these studies, however, is when these processes start to become salient. The previously mentioned studies all examined these factors in adolescents and children from the age of eight years and older. However, children probably form alcohol-related outcome expectancies at a much younger age, since they are already able to identify different alcoholic beverages from the age of three (Fossey, 1993; Zucker et al., 1995). Moreover, young children's preferences for toys and beverages with the smell of alcohol are already associated with parental alcohol use when they are as young as six months old (Mennella & Beauchamp, 1998; Mennella & Garcia, 2000). These findings provide an indication that expectancies regarding alcohol might also be formed at a very young age and that these expectancies might be related to parents' alcohol use in the early stages of life. Therefore, the present study examined the strength of alcohol-related outcome expectancies in children from six to nine years old and examined these expectancies and their association with parental alcohol use differed between younger compared to older children. In accordance with social learning theory (Bandura, 1986), the link between parental alcohol use and actual child experimentation with alcohol in the form of having sips of alcohol or drinking alcohol free children's champagne was also examined.

Besides ages, gender of the child as well as the parent might also be a defining factor in the formation of alcohol-related expectancies in relation to parental alcohol use. It appears that paternal alcohol use shows a stronger association with children's expectancies compared to maternal alcohol use (Handley & Chassin, 2009; Pieters et al., 2010), and this association appears to be stronger for boys (Handley & Chassin, 2009). While this is a first indication of gender differences, to our knowledge there is very little research on gender differences in alcohol-related expectancies in young children. There is one study indicating that patterns of expectancies are the same for boys and girls (Dunn & Goldman, 1996). However, information is lacking on whether young boys' and girls' expectancies are equally strong and how these are related to paternal and maternal alcohol use.

In sum, the current study examined the strength of alcohol-related alcohol expectancies in 6-9 year old children. Further, it was examined whether these expectancies and children's experimentation with alcohol use were associated with parental alcohol use. These associations were compared between boys and girls and younger and older children. The hypotheses were that a) children as young as six years old have reliable expectancies about alcohol-related outcomes; b) these expectancies are stronger for older children c) parental alcohol use is related to children's alcohol-related expectancies and experimentation with alcohol use, and d) the associations between parental alcohol use and children's expectancies are stronger for paternal alcohol use and older children.

## Method

### Participants and Procedures

Parent-child dyads participating in the Kind in Zicht study (Stone et al., 2012), a cohort study into child mental health, were informed about this new part and asked to participate by mail. Of the 480 dyads that provided active parental consent, only 300 parents and their children were selected randomly to participate due to financial constraints. These children were first interviewed on a range of parenting and child variables from January-February 2011. Of these, 288 children still participated in interviews held during the second year at schools from January-February 2012, when alcohol-related questions were added. The data collected from these 288 children in 2012 were used for the current study. Since only 7.3% of the dyads included fathers, these were excluded in order to control for parent's gender, leading to a final sample of 240 children. Children's (47.9% boys) age ranged from 6 to 9 years, with a mean age of 8.02 ( $SD = 1.13$ ). The majority of children was of Dutch origin (97.8 %) and came from two-parent families (92.1 %). Of the mothers, 53.2 %, 37.9 % and 7.2 % had a high (bachelor), medium (tertiary education) and low (upper secondary education) educational level, respectively. To ensure confidentiality, the videotaped interviews were conducted in a separate room at the schools. When the interview was completed children received stickers as a small token of appreciation.

### Measures

**Child measures.** All child measures were collected using the Berkeley Puppet Interview (BPI; Measelle, Ablow, Cowan, & Cowan, 1998), which uses hand puppets to accomplish an interactive age-appropriate interview eliciting self-perceptions from 4.5-8 year-olds. The BPI has proven a reliable and valid instrument to assess children's self-perceptions (Arseneault, Kim-Cohen, Taylor, Caspi, & Moffitt, 2005; Measelle et al., 1998). During the actual BPI children are interviewed by using two identical dog hand puppets, named Iggy and Ziggy. Throughout the interview the puppets make opposing statements about themselves and then ask the child 'How about you?' The puppet with whom the child agrees then repeats the child's answer, thereby appraising the child's answer. Interviewers were certified BPI administrators.

Nuance was given to the BPI scores as interviews were coded by four trained observers on a 7-point scale. Responses that reflect the presence of expectancies are coded 5, 6 or 7, depending on the weight the child puts in its answer. Whereas a 7 would reflect the highest end of presence (e.g., Adults always become friendly/mean when they drink alcohol), the 6 would reflect the average presence response and the 5 a hesitant response (e.g., Most of the time, adults become friendly/mean when they drink alcohol). At the opposite end of the spectrum, 1, 2 or 3, reflect absence of expectancies. Here 1 refers to the highest end of absence (e.g., Adults never become friendly/mean when they drink alcohol), 2 reflects the average absence response and 3 again reflects a hesitant response indicating absence of



expectancies (e.g., Most of the time, adults do not become friendly/mean when they drink alcohol). When a child is not able to choose either one of the statements, this is coded a 4. To test whether coders were reliable, 15 % of the videos were double-scored. Inter-rater agreement was satisfactory (ICC .93).

**Alcohol expectancies.** To measure alcohol expectancies, the negative and positive subscales of the adjusted Dutch translation of the Alcohol Expectancies Scale for Children (Dunn & Goldman, 1996) were used, consisting of seven items each. Questions were for example: "Adults (do not) become friendly/mean when they drink alcohol. With the first alcohol questions, it was explained to children that this could be for example beer or wine. A factor analysis with principal axis factoring and an oblimin rotation confirmed a positive and negative expectancies subscale. Factor loadings ranged between .42 and .82 (see Appendix). Alphas for the positive and negative subscale were .89 and .85.

**Children's champagne use.** Children were asked whether they (do not) drink children's champagne, which is alcohol-free champagne marketed for children, produced by the alcohol industry.

**Alcohol use.** Children were asked whether they ever/never drank alcohol. Answers were recoded to result in a dichotomous scale, where 1 = ever and 0 = never.

**Parental alcohol use.** Intensity of drinking was assessed by asking the mother about the number of drinks she had in the previous week during weekdays and in weekends, both at home and outside the home (Engels, Knibbe, & Drop, 1999). Since adults were shown to reliably report on their partner's alcohol use (Parekh, King, Owen, & Jamrozik, 2009), the same questions were asked about the women's partner's alcohol use. The scores on these four intensity questions were summed to obtain an indication of the total number of glasses consumed per week.

### Strategy for Analysis

As the BPI uses a bipolar answering method (i.e., agreeing with one puppet or the other to a certain degree), responses follow a bimodal rather than a normal distribution. Consequently, the frequency distribution of the 7-point BPI scores looks like a skewed normal curve with two peaks. The BPI is thus actually an index scale, not a Likert scale. In order to treat it as a Likert scale, we developed a scoring system wherein we transformed BPI responses such that they resulted in a normally distributed scale. Each item was transformed into two new items; one presence and one absence item. This was computed as follows: the low scores of the original 7-point scale (i.e. the 1, 2, and 3 responses) and the neutral score were coded zero for the presence item and recoded into 3, 2, and 1 for the absence item, hereby giving the most extreme score the highest weight. The high scores of the original 7-point scale (i.e. the 5, 6, and 7 response) and the neutral score were coded zero for the absence item and recoded into 1, 2 and 3 for the presence item. Subsequently, the absence items sum scores were subtracted from the presence items sum scores, thereby creating a difference score. These difference scores were used in subsequent analyses.

First, means, standard deviations, and bivariate correlations were computed for all study variables. Second, associations between parental alcohol use on the one hand, and child alcohol use, children's champagne use, and alcohol expectancies on the other hand were examined with MPLUS version 5.1 (Muthén & Muthén, 1998-2010). Parameters in the model were tested using a weighted least square method with standard errors and mean- and variance-adjusted chi-square (WLSMV) estimator. Path estimates for the continuous and dichotomous dependent variables are reported as respectively standardized linear and standardized probit regression coefficients. Probit coefficients differ from linear coefficients in that they indicate the change in the cumulative normal probability of the dependent variable, given that the predictor increases with one unit. Third, moderation effects of gender and age were tested with multi-group analyses. Children were split into a younger group, aged six to eight, and an older group, above eight years old. Differences in structural paths between the two groups were examined with a chi-square difference test by comparing the unconstrained model with a constrained model with equal paths across gender or age (Satorra & Bentler, 2001). Since the models were saturated (perfect fit), goodness-of-fit statistics were not reported.

## Results

### Descriptive Statistics

Descriptive statistics showed that 21.6% of the children reported that they ever drank alcohol. Children did not differ in their reported strength of positive ( $M = -3.66$ ,  $SD = 10.11$ ) and negative ( $M = -5.12$ ,  $SD = 9.01$ ) expectancies ( $t(239) = -1.36$ ,  $p = .18$ ). Boys and girls did neither differ in the strength of negative ( $t(234) = -.50$ ,  $p = .62$ ) nor positive ( $t(234) = -1.89$ ,  $p = .06$ ) expectancies. Older children ( $M = -6.08$ ,  $SD = 9.10$ ) had less positive expectancies compared to younger children ( $M = -1.18$ ,  $SD = 10.46$ ;  $t(278) = 4.02$ ,  $p < .001$ ), while they had more negative expectancies ( $M = -2.93$ ,  $SD = 9.41$ ) compared to younger children ( $M = -7.79$ ,  $SD = 7.55$ ;  $t(278) = -4.87$ ,  $p < .001$ ). Bivariate correlations between study variables (Table 1) showed that paternal and maternal alcohol use were positively related. Positive and negative alcohol expectancies were inversely related. Child alcohol and children's champagne use were positively related.

### Associations between Parental Alcohol Use and Child Expectancies and Alcohol Use

As can be seen in Table 2, a path model for the total group of children showed that parental alcohol use was not related to child alcohol use and children's champagne use. Except for a negative association between paternal alcohol use and negative alcohol expectancies, parental alcohol use and child expectancies were not associated. However, when gender differences were taken into account, the negative association between

Table 1 Correlations between model variables

	2.	3.	4.	5.	6.
1. Alcohol use mother	.52*	-.05	-.04	.06	-.03
2. Alcohol use father		.07	-.12	.07	-.03
3. Positive alcohol expectancies			-.52*	-.01	-.07
4. Negative alcohol expectancies				.00	.03
5. Child alcohol use					.29*
6. Child champagne use					

Note. \* $p < .001$

paternal alcohol use and negative alcohol expectancies was only present for girls. This means that for the girls, more alcohol use of the father was associated with less negative alcohol expectancies. When age was taken into account, there appeared to be a negative association between maternal alcohol use and positive alcohol expectancies and a positive association between paternal alcohol use and positive alcohol expectancies, but only for older children. This means that for the older children, more alcohol use of the mother was related to less positive expectancies, while more alcohol use of the father was related to more positive expectancies.

Discussion

The present study examined the existence and strength of alcohol-related expectancies in 6-9 year old children. Further, it was examined whether these expectancies and children's experimentation with alcohol use were associated with parental alcohol use. These associations were compared between boys and girls and younger and older children. Factor analysis showed that children as young as six years old can distinguish between and report consistently on the positive and negative consequences of alcohol use among adults and can report about these expectancies in a reliable way. It seems that the Berkeley Puppet Interview (Measelle et al., 1998) is also an age-appropriate instrument to measure cognitions related to alcohol in young children. Boys and girls did not differ in their strength of reported positive and negative expectancies. The present study showed that children reported as much positive as negative expectancies. Contrary to previous research indicating that older children report more positive expectancies (Donovan et al., 2009; Dunn & Goldman, 2000; Hipwell et al., 2005; Noel & Thomson, 2012), the older children in this sample reported less positive and more negative expectancies compared to the younger children. Apparently,

Table 2 Associations between parental alcohol use and child expectancies and behaviors and differences between boys and girls and younger and older children

	Total group (N = 240)		Gender differences				Age differences			
	$\beta$	(SE)	Boys (N = 113)		Girls (N = 123)		Younger (N = 113)		Older (N = 119)	
			$\beta$	(SE)	$\beta$	(SE)	$\beta$	(SE)	$\beta$	(SE)
Maternal alcohol use → child alcohol use	.03	(.10)	-.05	(.14)	.08	(.14)	-.05	(.17)	.06	(.14)
Maternal alcohol use → child champagne use	-.02	(.08)	-.08	(.14)	.01	(.10)	-.05	(.11)	-.02	(.12)
Maternal alcohol use → positive expectancies	-.11	(.08)	.06	(.12)	-.19	(.12)	.10	(.11)	-.27*	(.13)
Maternal alcohol use → negative expectancies	.04	(.07)	-.11	(.11)	.11	(.10)	.07	(.08)	-.01	(.11)
Paternal alcohol use → child alcohol use	.05	(.10)	.05	(.16)	.07	(.14)	.04	(.17)	.10	(.13)
Paternal alcohol use → child champagne use	-.02	(.08)	.01	(.13)	-.04	(.11)	-.04	(.12)	-.01	(.11)
Paternal alcohol use → positive expectancies	.12	(.08)	.03	(.12)	.16	(.11)	-.06	(.11)	.31**	(.11)
Paternal alcohol use → negative expectancies	-.14*	(.07)	-.03	(.11)	-.20*	(.10)	-.11	(.11)	-.18	(.10)

Note. \* $p < .05$  \*\* $p < .01$

even though children this young have little experience with drinking alcohol, they have clear ideas about the consequences drinking alcohol can have. Probably, these ideas about alcohol originate from their most important role models with regard to alcohol at this age; their parents.

Indeed, results showed that more paternal alcohol use was related to less negative alcohol expectancies in children, especially for girls. For older children, more paternal alcohol use was related to more positive alcohol expectancies, while more maternal alcohol use was related to less positive expectancies. Overall, these findings do provide some evidence for the cognitive model of intergenerational transference (Campbell & Oei, 2010), since they indicate that certain behaviors in parents are related to children's ideas about these behaviors even before most of these children themselves exhibit them. Nevertheless, the results also suggest that these processes can differ between dyads of different gender constellations. Especially, the link between parental alcohol use and positive alcohol expectancies is present for the father-daughter dyad, but not for the father-son dyad. Previous studies also consistently found that paternal alcohol use was more strongly related to children's expectancies (Handley & Chassin, 2009; Pieters et al., 2010). However, they showed that this link was stronger for sons (Handley & Chassin, 2009), and not for daughters. A reason why this study showed a link for daughters might be that – at this young age – girls have a cognitive advantage over boys (Bennett, Farrington, & Huesmann, 2005), and might therefore be better able to form expectancies based on observed behaviors in their environment. Indeed, Bekman, Goldman, Worley, and Anderson (2011) showed that 7-12 year old children's enhanced concept formations skills were related to increased strength of alcohol expectancies. The same cognitive advantage might account for the fact that this study showed a link between parental alcohol use and positive expectancies for older children, and not for younger children, although this should be examined in future research.

Associations between parental alcohol use and children's alcohol expectancies for older children differed between mothers and fathers. For mothers, the more alcohol they drink the less positive expectancies their children have. For fathers, the more alcohol they drink the more positive expectancies their children have. Apparently, more maternal alcohol use is related to less positive ideas concerning alcohol in children, while more paternal alcohol use is related to more positive ideas. While we did not expect to find this difference, it could be explained by several factors. First of all, mothers are known to drink less alcohol compared to fathers, and this difference is even larger for mothers of young children (Van Laar et al., 2011). This indicates that it could be considered non-normative for mothers of young children to drink considerable amounts of alcohol. Moreover, mothers are less likely than father to drink alcohol in front of their children (Verdurmen et al., 2008). Interestingly, mothers that do drink relatively large amounts of alcohol and consume it in front of their children also reported relatively many drinking problems (Vermeulen-Smit et al., 2012). When mothers drink considerable amounts of alcohol in front of their children, this could be considered non-normative or problematic and might be associated with less positive

ideas about alcohol in children. Second, mothers and fathers often tend to fulfill somewhat stereotype roles in the home. Mothers tend to provide more sensitivity, structure and stability, while fathers tend to be more spontaneous and play more with their children (Lewis & Lamb, 2003). Since the effects intoxication generally has on adults resembles the normative behavior of fathers more compared to mothers, children might have more positive associations with paternal alcohol use and less positive associations with maternal alcohol use. Taken together, the findings discussed above indicate that children have very clear alcohol expectancies at a fairly young age. Further, the fact that we found associations between parental alcohol use and children's expectancies for older children but not for younger children indicates that these expectancies become associated with parental alcohol use somewhere between the ages of six and nine. Future research should further entangle the exact formation process of alcohol expectancies in a developmental perspective.

While we did expect that children's first experimentation with alcohol use would be related to parental alcohol use as well, this hypothesis was not confirmed. Results showed that there were no associations between parental alcohol use and children's alcohol use and between parental alcohol use and children's champagne use. The reason for not finding this association could be that children are so young that they do not have access to alcohol and generally have had no more experience with alcohol but an incidental sip. Therefore, variation in tasting is rather low and the possibility for finding an association with a parent variable is limited. Taken together, results of the present study fit well in the context of the cognitive model in intergenerational transference (Campbell & Oei, 2010). One could argue that these children are already in the 'early stages' of transference, in that they have formed clear alcohol expectancies, and that these are related to parental alcohol use when they are somewhat older. Nevertheless, they are still too young to have reached the 'final stage' of transference, which is from cognition to behavior. This means that these children have already formed ideas concerning alcohol based on the behaviors they observe in their parents, but these ideas were not yet related to their own behaviors.

Since the present study has a cross-sectional design, we were not able to test these causal pathways and separate 'stages' of the intergenerational model of transference (i.e. observed behavior – formation of internal working models – own behavior). Future studies should therefore examine these processes with prospective data in young children, in order to determine when and how these processes start to develop. Further, although the child-appropriate measure we used in this study yielded highly reliable and consistent results with regard to explicit alcohol expectancies, many studies indicated that besides explicit expectancies, implicit alcohol expectancies might play an important and distinctive role (Noel & Thomson, 2012; Pieters et al., 2010). Overall, implicit associations tend to be more negative rather than positive, while explicit associations tend to be more positive rather than negative. Since older participants in the present study reported more negative expectancies compared to positive expectancies, it might be important to compare these results to implicit measures in future research.

Concluding, the present study showed that children as young as six years old have reliable and consistent expectancies about the consequences of alcohol use among adults. The measurement instrument used in this study - the BPI - is an age-appropriate way to measure cognitions in children such as expectancies. These alcohol expectancies appear to be more negative than positive for older children. Further, results suggest that these expectancies come to be associated with parental alcohol use somewhere between the ages of six and nine. While maternal alcohol use is associated with less positive alcohol expectancies, paternal alcohol use is associated with more positive expectancies. Apparently, young children already have clear ideas about a substance, such as alcohol, they have had none to little experience with consuming themselves. These expectancies are partly associated with alcohol use in their direct home environment. When replicated, prevention programs might benefit from making parents aware of the existence of these expectancies – which have been shown to be related to juvenile alcohol use later in life (Anderson et al., 2011; Bekman, Anderson, et al., 2011; Larsen et al., 2012) – in their young children and how these are related to their own behaviors. Future research should examine how the inter-generational transference of alcohol use unfolds over time from an early age on.

Appendix

Factor loadings for exploratory factor analysis with principal axis factoring and oblimin rotation and means and standard deviations of alcohol expectancies items

Item	Positive expectancy loadings	Negative expectancy loadings	M	SD
Adults (do not) become ... when they drink alcohol:				
Bold	-.02	<b>.65</b>	3.26	1.78
Lively	-.02	<b>.62</b>	4.04	1.95
Mean	.06	<b>.72</b>	2.74	1.51
Dangerous	.04	<b>.67</b>	2.87	1.61
Wild	.01	<b>.74</b>	3.15	1.75
Kind	<b>.42</b>	-.26	3.35	1.79
Happy	<b>.73</b>	-.00	3.60	1.89
Content	<b>.63</b>	-.06	3.50	1.88
Annoying	-.08	<b>.66</b>	3.34	1.85
Angry	-.08	<b>.63</b>	3.10	1.74
Pleasant	<b>.79</b>	.12	3.48	1.88
Friendly	<b>.75</b>	-.07	3.55	1.92
Nice	<b>.76</b>	-.08	3.49	1.89
Happy	<b>.82</b>	.05	3.64	1.93

Note. Factor loadings > .40 are in boldface.

## Chapter 4

The mediating role of  
alcohol-related memory associations  
on the relation between perceived  
parental drinking and the onset  
of adolescents' alcohol use



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## Abstract

The aim of the current study was to examine the mediating role of alcohol-related memory associations in the relation between perceived parental drinking and the onset of adolescents' alcohol use. Gender and grade were also included in the analyses. We tested a mediation model within a structural path modeling framework using longitudinal data (two waves). The sample consisted of 608 Canadian adolescents (43% boys), who did not have any alcohol experiences at the first measurement. The adolescents were recruited from all grade seven to nine classes in a large school district in western Canada. Alcohol-related memory associations were tested with the Word Association Test. We used adolescent self reports of alcohol use and parental drinking. Results clearly showed a mediation effect of alcohol-related memory associations (Estimate = .023, 95% CI = .002 - .044). That is, parental drinking as perceived by the adolescent was positively related to alcohol-related memory associations, which in turn predicted adolescents' alcohol use a year later. Gender ( $B = -.10, p < .05$ ) and grade ( $B = .13, p < .001$ ) were related to alcohol-related memory associations. That is, boys and adolescents of higher grades had more memory associations. The current findings indicate that children form memory associations related to alcohol before they ever drank alcohol themselves, and that these associations mediate the link between perceived parental drinking behaviors and adolescents' initial alcohol use.

## Introduction

Nowadays, there is increased consensus about the impact of implicit alcohol cognitions on alcohol consumption (e.g. Rooke, Hine, & Thorsteinsson, 2008; Stacy & Wiers, 2010; Wiers & Stacy, 2006). Implicit cognitions, such as memory associations, refer to relatively automatic activation processes of which a person is not immediately aware (Gawronski, LeBel, & Peters, 2007; Greenwald & Banaji, 1995; Wiers & Stacy, 2006). For instance, by perceiving alcohol cues or consequences of drinking in the environment, cognitions about alcohol are spontaneously activated in memory, and therefore drinking becomes a salient behavioral option (Stacy & Newcomb, 1998). Repetitive exposure to alcohol forms and strengthens these alcohol-related memory associations (Stacy, 1995), which in turn guide subsequent drinking behavior automatically (Stacy, 1997). Thus, the relation between memory associations regarding alcohol and actual alcohol use could be considered a bi-directional learning process.

Memory associations have a unique, and rather independent, contribution to alcohol use beyond positive or negative expectancies (Wiers & Stacy, 2006). Individuals who have more memory associations regarding alcohol, drink alcohol more frequently (Ames et al., 2005; Palfai & Wood, 2001; Stacy, 1997; Stacy & Newcomb, 1998), are more often intoxicated (Stacy, 1997), and report more alcohol-related problems (Thush et al., 2007). The prospective relation between memory associations and alcohol use has been found for (emerging) adults (Palfai & Wood, 2001; Stacy, 1997) as well as (older) adolescents (Krank & Goldstein, 2006; Thush et al., 2007). Children and early adolescents have hardly been the subject of research in memory associations partly because they do not drink alcohol yet (Monshouwer et al., 2003; Pieters et al., 2010). However, children and early adolescents have been exposed to diverse alcohol cues and outcomes in their environment throughout their life (Dalton et al., 2005). For example, they have observed their parents' drinking and related consequences, other adult drinking at parties and in restaurants, alcohol advertisements on billboards, and alcohol use by actors on TV and in films. As outlined before, exposure to alcohol cues and outcomes results in alcohol-related memory associations (Lau-Barraco & Dunn, 2009; Zack, Sharpley, Dent, & Stacy, 2009). Thus, children and early adolescents are likely to have developed alcohol-related memory associations long before they actually start drinking.

Although children and early adolescents are also exposed to other alcohol cues in their environment than their parents' drinking, it seems relevant to focus on parents. Namely, learning about new behaviors (alcohol use) depends strongly on the frequency, duration, intensity, and priority of exposure to significant others (Bandura, 1977; Sutherland, Cressey, & Luckenbill, 1992). In this regard, parents can be considered as the most important socializing agents for children and early adolescents. Parental alcohol use may convey social norms about alcohol (Dalton et al., 2005; Van der Vorst et al., 2006), and provide information about apparent physiological and psychological effects of drinking (Jackson, Henriksen, Dickinson, & Levine, 1997). In addition, most adolescents start to drink at home



in their parents' company (Mayer, Forster, Murray, & Wagenaar, 1998; Van Der Vorst, Engels, & Burk, 2010; Warner & White, 2003).

There is little research on the effect of exposure to parental alcohol use in childhood and early adolescence on the formation of (implicit) alcohol cognitions. A few cross-sectional studies indicated that children and early adolescents are sensitive to their parents' drinking behaviors before they drink alcohol themselves (Dalton et al., 2005). These studies reveal that (young) children can already distinguish alcoholic from non-alcoholic drinks based on smell (Noll et al., 1990), consider drinking as appropriate in social situations (Dalton et al., 2005), have certain knowledge about alcohol (Gaines, Brooks, Maisto, Dietrich, & Shagena, 1988), and have positive and negative alcohol expectancies resulting from their parents' alcohol use (e.g. Cameron, Stritzke, & Durkin, 2003; Query, Rosenberg, & Misak, 1998). Moreover, a recent study of Pieters et al. (2010) showed that paternal alcohol use was related to negative alcohol associations of young children. However, these alcohol associations are measured with a contrasting target category, which might affect the associations. Further, the task used in this study reflects whether adolescents' associations tend to be more positive or more negative. It does not examine whether (automatic) cognitions about alcohol are already present or not due to being exposed to parental drinking nor do they link these cognitions to the onset of alcohol use. To our knowledge, only one study exists on the association between drinking and the existence of memory associations regarding alcohol including also parental alcohol use (Stacy, 1995). In this study, both maternal and paternal alcohol use were not significantly related to college students' memory associations. Reasons for this lack of effect of parental alcohol use might be that a) previous alcohol experiences were included in the model, which strengthen alcohol cognitions (Wiers et al., 2007). Thus, previous alcohol experiences are probably stronger precursors of alcohol-related memory associations than social environmental alcohol cues, such as parents. And b) college students were the studies' subjects instead of early adolescents. Parents might be less important in the development of alcohol use and related memory associations in emerging adulthood than in early adolescence (Van der Vorst et al., 2009).

In sum, because early adolescents have been frequently exposed to parental drinking, it is reasonable to assume that they already have memory associations with respect to alcohol before they start drinking alcohol themselves. In addition, because previous studies showed that memory associations increase subsequent alcohol consumption, they might be also predictive for the onset of alcohol use. To our knowledge, no study has yet been published examining the role of memory associations on the actual onset of alcohol use. Parental drinking, on the other hand, has been related to (early) adolescents' onset of alcohol use (e.g. Monshouwer et al., 2003; Pedersen & Skrandal, 1998; Van der Vorst et al., 2009). Increased levels of parental alcohol use are related to higher odds of children starting to drink early. But these studies did not measure the mediating role of memory associations in their model.

Therefore, the aim of the present study is to determine the role of parental drinking (as perceived by adolescents) in alcohol-related memory associations and drinking onset. We hypothesized that higher levels of perceived parental alcohol use were associated with more memory associations with respect to alcohol in early adolescents, which in turn predicted the onset of alcohol use a year later. So, it was anticipated that memory associations mediated the relation between perceived parental drinking and the onset of alcohol use in early adolescence. We selected 608 early adolescents who reported never having had a drink of alcohol in the initial year of a Canadian longitudinal project on alcohol and drugs (Krank et al., 2011).

## Method

### Participants and Procedure

The participants in this study were from a longitudinal study on risk behavior, the Project on Adolescent Trajectories and Health (Krank et al., 2011). Students were recruited from all grade seven to nine classes in a large school district in western Canada, with a population of about 100,000. After obtaining parental informed consent and student assent, 1315 students completed the survey in the first year in Spring 2002. Participants completed the survey in groups ranging from 20 to 70 people under supervision of project staff and at least one teacher. Participants were identified each year by an identification code which allowed the data to be linked across survey years but preserved the participants' confidentiality. Each survey administration followed the same procedure: identification codes were confirmed and general instructions were read, followed by a series of sections with questions grouped by similarity. Sections were timed and surveys were completed within one hour. Twelve students were omitted from further analysis because they failed to complete over 50% of the survey leaving a total first-year sample of 1303. All sampling methods and procedures described were reviewed and approved by the Research Ethics Board of Okanagan University College (now UBC Okanagan) under the Canadian Research Ethics Guidelines of the Tri-councils.

At the start of the study, the students (44.7% male) ranged in age from 11 to 17 ( $M = 13.89$ ,  $SD = 0.88$ ), with 34.1% in grade seven, 35.0% in grade eight, and 30.9% in grade nine. Ethnicity was not measured in the questionnaire, but national census information indicates that the population is predominantly white (about 95%) with the largest minority being aboriginal (3.7%). The majority of participants lived with either their primary parents (70.5%) or a parent and step parent (11.8%), with 14.6% living with a single parent; the rest was in other types of living arrangements. Most parents had graduated from high school (32.0%), received a college diploma (29.4%), or graduated with a University degree (28.7%). Family income status was rated by student self-report as 7.9% below average, 50.4% average and 41.7% above average.

**Sample attrition.** Of the 1303 students who completed the first wave, 1142 (87.6%) completed surveys 12 months later (Wave 2). A logistic regression analysis examined demographic differences between participants and those lost to attrition. This analysis revealed that drop outs report lower income status, Wald = 5.062,  $p < .05$ , OR = 1.62. We selected the children who had never used alcohol at time 1 ( $n = 608$ ). This sample included 42.9% boys, 48.2% adolescents from grade 7, 33.1% from grade 8 and 18.8% from grade 9 at T1. Of this sample, 86.2% lived with both their parents, and 11% with a single parent. Around 30% of both mothers and fathers had graduated from high school, around 30% received a college diploma and another 30% graduated with a University degree.

## Measures

**Adolescents' alcohol use.** Alcohol use at Time 2 was assessed using standardized recent alcohol use questions (Krank, Schoenfeld, & Frigon, 2010). *Recent alcohol use* was measured with the item: "When was the last time you used alcohol?" Response options were: "Never, More than a year ago, In the past year, In the past month, and In the past week". These were recoded into dichotomous scores indicating whether the adolescent ever drank alcohol or not.

**Word associations about alcohol.** In the Word Association Test (WAT), adolescents were asked to write the first word that came to mind in response to a word with dual meanings. These words were chosen based on previous work with alcohol or marijuana (Stacy, 1995). The WAT triggers spontaneous responses of adolescents that do not require analytic deliberation (Nelson, McEvoy, & Dennis, 2000). Advantages of the WAT compared to other tasks such as the Implicit Association Task (Greenwald & Banaji, 1995) are that it measures free associations in competition with unlimited alternatives and that it is most comparable to everyday spontaneous activation processes, which are thought to influence behavior (Stacy, Ames, & Grenard, 2006). The test included a list of 44 homographs (words with an ambiguous meaning). The list included six alcohol-related homographs (for example, the probe *draft* might elicit responses of *paper* or *beer*). Two independent raters scored the alcohol words and sums were calculated to obtain scores from 0–6 (Cohen's kappa's ranged from .89 to .98). The scores of the number of alcohol words were taken as the memory measures of alcohol associations, with higher scores indicating more alcohol memory associations.

**Perceived parental alcohol use.** Participants completed a single item describing the perceived intensity of alcohol use of each parent at Time 1. Responses were based on a 7-point Likert scale ranging from "Never" to "Very Heavy" (Harburg, Davis, & Caplan, 1982). Adolescents could also reply with "Don't know/N/A", which was handled as a missing value. Adolescent reports of maternal and paternal alcohol use were moderately correlated ( $r = .57$ ), so these two items were averaged to create a composite measure of parental alcohol use.

## Strategy of Analyses

We initially examined correlations between all models variables. The primary analysis was a structural path model (Figure 1) that investigated indirect effects with bootstrapped standard errors and confidence intervals (Mplus 6.0; Muthén and Muthén, 1998–2010). This model tested whether the prospective association between perceived parental drinking and the onset of adolescent alcohol use was mediated by adolescent alcohol-related memory associations (Time 1). Adolescent sex and grade level were included as covariates in the model. Specifically, sex and grade were correlated with perceived parental drinking, and were used as predictors of alcohol-related memory associations and onset of adolescent alcohol use. Since the model was saturated (perfect fit), goodness-of-fit statistics were not reported.

## Results

### Descriptives

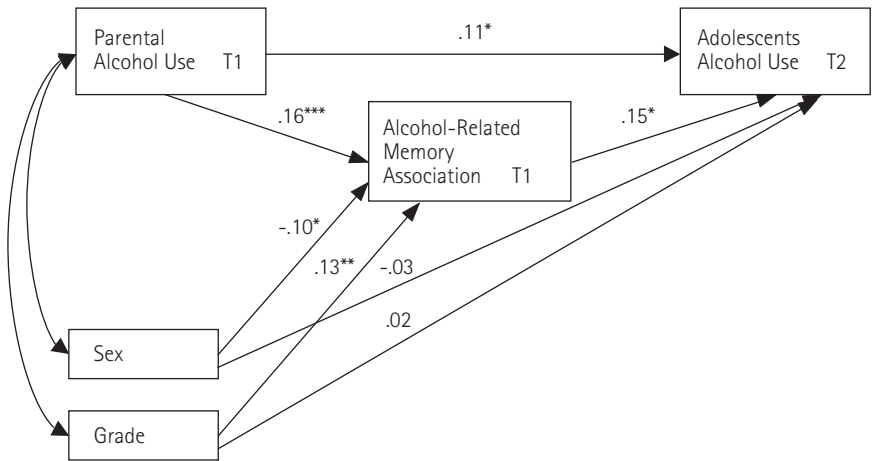
Of the adolescents 41% became a drinker at Time 2 (see Table 1). Sixty percent of the adolescents reported no memory associations regarding alcohol, 23.2% reported one memory association, 12.5% reported two memory associations, and the remaining 4% reported 3 or 4 memory associations regarding alcohol.

**Correlations between perceived parental alcohol use, alcohol memory associations, gender, grade and adolescents' alcohol use.** Both gender and grade were significantly related to adolescents' alcohol-related memory associations (see Table 1). That is, boys and adolescents from higher grades were more likely to have more memory associations than girls and adolescents of grade 7. Perceived parental alcohol use was positively related to the number of memory associations. Adolescents' memory associations regarding alcohol correlated significantly with adolescents' alcohol use. Parental alcohol use was positively related with adolescent drinking. All other correlations were non-significant.

**Alcohol memory associations mediating the relation between perceived parental drinking and the onset of adolescents' drinking.** The figure presents the standardized coefficients of the structural path model. Adolescent perceptions of parental alcohol use were positively associated with alcohol-related memory associations and the onset of adolescent alcohol use. Alcohol-related memory associations were also positively associated with the onset of adolescent alcohol use. Furthermore, alcohol-related memory associations mediated the prospective relation between perceived parental drinking and adolescent onset of alcohol use a year later (Estimate = .023, 95% CI = .002 - .044). The more adolescents perceived their parents to drink, the more alcohol-related memory associations adolescents had, which in turn predicted the onset of adolescent alcohol use. Both gender

and grade were only related to alcohol-related memory associations. That is, boys and adolescents attending a higher grade had more memory associations compared to girls and adolescents who attend a lower grade at school.

**Figure 1** The associations between parental drinking, alcohol-related memory associations, and the onset of adolescents' drinking.



Note. Path estimates for adolescents' alcohol use and alcohol-related memory associations are reported as respectively standardized linear and standardized probit regression coefficients. Probit coefficients differ from linear coefficients in that they indicate the change in the cumulative normal probability of the dependent variable, given that the predictor increases with one unit.

**Table 1** Correlations, means, and standard deviations of model variables

	1.	2.	3.	4.	M	SD
1. Parental Alcohol Use T1					1.54	.98
2. Memory Associations T1	.15***				.60	.87
3. Adolescents' alcohol use T2	.14**	.17***			.41	.49
4. Gender	-.07	-.11**	-.06			
5. Grade	-.07	.13**	.04	-.02		

Note. \*\*  $p < .01$ , \*\*\*  $p < .001$

Discussion

The aim of the present study was to examine whether alcohol-related memory associations mediate the link between parental alcohol use (as perceived by adolescents) and the onset of alcohol use in early adolescence. The findings clearly supported our hypothesis. That is, alcohol-related memory associations, measured with the Word Association Task about alcohol (Stacy, 1995), explained the prospective relation between perceived parental drinking and onset of adolescents' alcohol use. The more often adolescents reported that their parents drank alcohol, the more alcohol-related memory associations they had, and the higher the likelihood that they started to drink alcohol a year later. This finding adds in several important ways to the current literature.

First, it empirically shows that, although there are not that many, alcohol-related memory associations do exist before a person has ever been drinking alcohol. This supports the assumption of Rudman (2004) that these cognitions can originate in childhood. The finding also corresponds with previous studies (Pieters et al., 2010; O'Connor, Fite, Nowlin, & Colder, 2007; Thush & Wiers, 2007), which showed that children have positive and negative associations towards alcohol. Overall these results indicate that memory associations are related to alcohol cues in the environment, for instance, parental drinking. Previous research has shown that alcohol-related memory associations (of adults) are strengthened by environmental alcohol cues (Lau-Barraco & Dunn, 2009; Stacy, 1995). However, these studies implied that the formation of alcohol associations goes hand in hand with drinking alcohol; the more alcohol a person drinks, the more alcohol memory associations, and the more alcohol memory associations, the more a person drinks (Stacy & Newcomb, 1998). Moreover, scholars suggested that someone needs to have repeated experiences with alcohol before alcohol associations are actually created, so called incentive sensitization theory (Robinson & Berridge, 1993). This might indeed be the case for developing addictive behaviors, but at baseline it seems parental drinking, experienced by adolescents, is associated with initial (light) incentive properties, which probably becomes stronger after repeated alcohol intake later in life due to the pharmacological properties of alcohol.

Second, dual process models of addictive behaviors state that explicit and implicit alcohol cognitions co-exist in adults and adolescents (e.g. Wiers et al. 2007) and uniquely predict alcohol use (e.g. Wiers & Stacy, 2006). The general idea is that implicit cognitions refer to fast automatic processes, whereas explicit processes are slow and based on rational decision making and introspection (e.g. Greenwald & Banaji, 1995; Strack & Deutsch, 2004). Previous studies have shown that children and early adolescents who have not drank alcohol yet already have explicit alcohol cognitions, such as positive and negative alcohol expectancies (e.g. Cameron et al., 2003; Dunn & Goldman, 1996), which predict the onset of alcohol use (e.g. Aas, Leigh, Anderssen, & Jakobsen, 1998; Goldman, Brown, Christiansen, & Smith, 1991). The data from the present study are first to show that this association holds

also for more implicit alcohol-related memory cognitions. The question remains, however, at what age are implicit alcohol cognitions formed. More specifically, at what age do young children become susceptible to their parents' drinking behaviors? Further, it seems important to determine how alcohol associations are formed and develop during childhood so children at risk for early alcohol use can be identified (Krank & Goldstein, 2006). Taken together, it seems that in childhood, thus also before drinking alcohol, implicit alcohol cognitions exist in people's minds and that these cognitions are related to the behaviors of parents.

Third, findings of the current study support the idea of delayed modeling (Bandura, 1977, 1986). Based on Social Cognitive Learning theory (Bandura, 1977, 1986), the formation of alcohol attitudes, expectancies, and the use itself results from exposure to alcohol use and attitudes of significant others, which are parents for children. Children observe their parents' drinking behaviors, which are typically moderate alcohol use in social situations (Verdurmen et al., 2008). The idea of delayed modeling refers to the possibility that a long period elapses before children model their parents' behaviors, because the opportunity for children to put the learned behavior into practice might not arise until much later. As the current study shows, children form memory associations about alcohol before they started to drink alcohol themselves. In turn, the alcohol-related memory associations triggered the modeling of their parental behaviors later on, perhaps because the early adolescents found themselves more mature and in a similar situation as when they observed their parents using alcohol (Dalton et al., 2005).

The current study also showed that gender and grade are related to alcohol-related memory associations. Although males and adolescents of higher grades are known to drink more frequently and higher amounts of alcohol (Poelen, Scholte, Engels, Boomsma, & Willemsen, 2005; Van Der Vorst et al., 2009), previous studies among (emerging) adults did not show gender differences in alcohol-related memory associations (Palfai & Wood, 2001; Stacy and Newcomb, 1998). Due to selection of merely non-drinkers at baseline, no associations were found between grade, gender, and alcohol use a year later. Nevertheless, in our study, boys and older adolescents (grade 8) had more alcohol-related memory associations which in turn predicted a higher likelihood of alcohol consumption a year later. Taken together, it seems that males and females develop alcohol-related memory associations differently during adolescence and become more similar in their memory associations in adulthood. However, future longitudinal research investigating the development of alcohol cognitions should test differences between males and females of different ages to draw firm conclusions.

### Strengths and Limitations

Despite the strengths of the current study, such as the relatively large sample size and longitudinal design, some limitations must be acknowledged. First, we focused on parental drinking, because of the salient place parents have in their children's lives. However, alcohol cues are also provided by other environmental subjects, like relatives, peers, parents of

peers, and the media (e.g. Zack et al., 2009). For instance, a recent study of Engels, Hermans, Van Baaren, Hollenstein, and Bot (2009) showed that young adults are acutely influenced by watching someone drinking alcohol on television. Young children are probably not immediately triggered to use alcohol by watching people drink in movies or commercials, but they might already form alcohol associations in memory because of this exposure. It could be that these environmental cues also affect adolescents' memory associations, and in combination with the fact that parental drinking and memory associations were measured concurrently, causal inferences about the association between these two are difficult to make. Second, we focused in this study on normative parental drinking. However, it would be interesting whether the same effects will be found in families with parents who are problem drinkers or alcohol dependent. Moreover, while parental alcohol use was reported by adolescents in this study, future research might use parental reports of their own alcohol use. Third, although the Word Association Test about alcohol showed predictive validity (Stacy, 1997; Stacy, et al., 2006; Wiers et al., 2007) and is a well known and used implicit measure, it does not assess the valence of the memory associations; so whether the associations about alcohol are positive or negative, or both at the same time, as is measured with explicit alcohol expectancies (Leigh & Stacy, 1993). Therefore, it would be relevant to replicate the present study using other implicit measurements such as the (Single Target Unipolar) Implicit Association Test which take affect into account (Greenwald & Banaji, 1995; Thush & Wiers, 2007), which would make inferences about motivational processes possible. Further, our findings might not reflect the situation in countries with other drinking cultures, and should therefore be replicated.

### Implications

Alcohol prevention could benefit from the current findings. First, this study support previous suggestions to include parents in alcohol prevention programs (Jackson & Dickinson, 2009; Koning et al., 2009; Smit et al., 2008). Parents should be made aware of the fact that they influence their children's memory as well as alcohol involvement later on by drinking in their children's presence (Van Der Vorst et al., 2009) even before their children are considering drinking alcohol. Thus, alcohol prevention programs should provide parents specific information to minimize the effects of their drinking on the associations their children have with alcohol use (Jackson & Dickinson, 2009). Second, our results indicate that alcohol prevention programs should start in (late) childhood to delay the age of onset (Jackson & Dickinson, 2009). This is important because a delay in the consumption of the first glass of alcohol results in a lower risk of several alcohol-related problems in adolescence and adulthood (e.g. Behrendt et al., 2008; Englund et al., 2008). Finally, prevention programs could include implicit cognitions measurements to identify the stage of risk to start drinking among children and provide a specific prevention program accordingly (Krank & Goldstein, 2006). At the least such measures identify youth who are at greater risk for early transitions to alcohol use and should be the target of more selected interventions. Understanding the

cognitive mediators of social risk factors may also suggest novel approaches to reducing the impact of these associations on decision processes such as developing alternative less risky associations (Krank & Goldstein, 2006).

## Chapter 5

Alcohol-specific parenting,  
adolescent alcohol use, and the  
mediating effect of adolescent  
alcohol-related cognitions



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## Abstract

Previous research indicated that alcohol-specific parenting is an important precursor of adolescent alcohol use, but failed to define the underlying mechanism. Based on social-cognitive theory, alcohol-related cognitions such as alcohol refusal self-efficacy and alcohol-related expectancies were hypothesized to mediate this link. A cross-sectional survey included 1,349 mothers and their 6th grade (11-12 years old) adolescent offspring. Structural Equation Modeling was employed to test the association between alcohol-specific parenting and adolescent alcohol use, mediated by adolescent alcohol-related cognitions. Main outcome measures were adolescent alcohol use, drinking refusal self-efficacy, and alcohol expectancies. The associations between frequency of communication, maternal alcohol use and adolescent alcohol use were mediated by negative alcohol-related expectancies. The associations between quality of communication, rules, and disclosure and adolescent alcohol use were mediated by self-efficacy. The present study provides a first indication that the underlying mechanism of the association between the most important alcohol-specific parenting practices and adolescent alcohol use can be contributed to the mediating effect of alcohol-refusal self-efficacy.

## Introduction

In recent years, alcohol-specific parenting has emerged from the literature as a unique factor explaining adolescent alcohol use above and beyond general parenting practices, such as support or control (Jackson et al., 1999; Ryan et al., 2010; Van Zundert et al., 2006). Several alcohol-specific strategies of parents to prevent their adolescent offspring from consuming alcohol have been examined, including alcohol-specific rule-setting and quality and frequency of alcohol-specific communication (e.g., Spijkerman et al., 2008; Van der Vorst et al., 2005). The most consistent predictor of adolescent alcohol use is alcohol-specific rules parents set for their children. Across adolescence, strict alcohol-specific rules were predictive of later onset of alcohol use, as well as a lower frequency and intensity of alcohol use once adolescents already started drinking (Mares, Lichtwarck-Aschoff, Burk, Van der Vorst, & Engels, 2012; Van der Vorst, Engels, Dekovi, Meeus, & Vermulst, 2007). Strict alcohol-specific rules do not only appear to prevent adolescent alcohol use on the short-term, but also long-term effects from strict rules in early adolescence on decreased alcohol use in late adolescence have been found (Van der Vorst et al., 2009). This indicates that setting strict alcohol-specific rules is an important strategy for parents to withhold their children from engaging in (heavy) drinking.

Besides rule-setting, adequate parent-child communication is generally thought of as a way for parents to prevent health-risk behaviors in their children (Riesch et al., 2006). Regarding alcohol-specific communication, a distinction can be made between the frequency and the quality of communication about alcohol. Results on the associations between frequency of alcohol-specific communication and adolescent drinking have been mixed. Mostly, no association between frequency of alcohol-specific communication and adolescent alcohol use is found (Abar et al., 2011; Ennett, Bauman, Foshee, et al., 2001), with some studies presenting small positive associations for heavy-drinking males only (Van der Vorst, Burk et al., 2010) or small negative associations (Mares, Van der Vorst, Engels, et al., 2011; Miller-Day & Kam, 2010). What is often suggested to be of more importance to prevent adolescent alcohol use is the quality of these discussions. However, only one study provides evidence for the link between high quality of alcohol-specific communication and less adolescents' drinking (Spijkerman et al., 2008). In this particular study, high quality was defined as parents and adolescents being able to have an honest, calm, and comfortable conversation about alcohol.

Despite the fact that research on alcohol-specific parental factors has rapidly expanded over the last decade, not much is known about the underlying process that accounts for the transference of these rules and conversations to the actual alcohol use of adolescents. Since situations that potentially involve adolescent alcohol use often do not involve the presence of parents, there must be an intervening factor that transfers the alcohol-specific parenting practices in the at-home context to the adolescent alcohol use behaviors in the outside-the-home contexts. According to Bandura's social cognitive theory, the link

between one's environment (parenting) and one's actions (alcohol use) can be regulated by an individual's self-regulatory system (Bandura, 1986). This system is a combination of both the beliefs of one's own self-efficacy and the beliefs about likely outcomes (Bandura, 2004; Pajares, 1997). When we translate these concepts to the field of substance use, or more specifically, alcohol use, these are the beliefs of one's self-efficacy to refuse alcohol and the positive and negative outcome expectancies concerning alcohol use. The association between these concepts and adolescent alcohol use has been the subject of ample studies and indeed, more refusal self-efficacy and negative expectancies, and less positive expectancies are related to less alcohol use in young adolescents (e.g. Aas et al., 1995; Connor et al., 2011; Lee & Oei, 1993; McKay et al., 2011). This suggests that adolescent alcohol use is preceded by internal factors, so-called cognitions towards alcohol, that guide adolescents toward the decision to drink alcohol or not.

What is less known, however, is what precedes these cognitions. We postulate that alcohol-specific rule-setting and communication affects alcohol-specific cognitions. When parents express their opinions and boundaries regarding alcohol, they create a normative framework regarding the dos and don'ts of alcohol use. At first, this framework functions as an external control system. Over time, adolescents will gradually internalize these values and norms, after which they become part of the self-regulatory system of the adolescent (e.g. Zimmer-Gembeck & Collins, 2006). One aspect that is potentially important when considering the quality of communication and – to our knowledge – has never been studied is parental disclosure about their own alcohol use. In general, self-disclosure is seen as an important aspect of successful communication between parents and their children (Noller & Callan, 1990). Parental alcohol use has been widely acknowledged as an important correlate of adolescent alcohol use (e.g., Poelen et al., 2007; Ryan et al., 2010; White et al., 2000). Perhaps parents can compensate for this effect by communicating about their own alcohol use and by putting their own alcohol use into perspective. They could explain how their drinking alcohol is different from their children drinking alcohol, and also explain what kind of negative consequences drinking alcohol can have, also for themselves. As a result, adolescents may have more realistic ideas of the positive and negative consequences of drinking alcohol, and it may prevent them from simply modeling their parents' behaviour and start to drink at an early age. Furthermore, when parents disclose about their alcohol use adolescents might feel more connected to their parents (Collins & Miller, 1994) which creates a fertile environment for parental socialization practices (Ryan & Powelson, 1991). Since parental self-disclosure has been positively related to adolescent well-being, including self-esteem and problem solving (Xiao, Li, & Stanton, 2011), these positive effects of self-disclosure might also extend to alcohol use in a sense that it improves adolescents' ability to resist alcohol when offered and lead to increased drinking refusal self-efficacy. Therefore, in the current study, parental disclosure about their alcohol use is taken into account as a possible predictive factor of adolescents' alcohol-related cognitions.

The proposed indirect association between alcohol-specific parenting and adolescent alcohol use through adolescent cognitions is mainly based on Bandura's social-cognitive

theory (Kutner, 2002). Although this mechanism has been confirmed in other areas such as adolescent smoking (Harakeh et al., 2004; Hiemstra et al., 2012; Huver et al., 2006; Otten et al., 2007), there is limited application in the field of alcohol use. Only two studies explored this type of mechanism in the area of adolescent alcohol use (Campbell & Oei, 2010; Watkins et al., 2006). These studies found that self-efficacy and alcohol expectancies mediated the association between parental monitoring and parental alcohol use on the one hand and adolescent alcohol use on the other. However, important alcohol-specific parenting practices such as alcohol-specific rules, quality of communication, parental alcohol use and disclosure about parental alcohol use were not included. Concluding, whether there is an indirect link between alcohol-specific parenting practices and adolescent alcohol use through different forms of adolescent alcohol-related cognitions still needs empirical examination.

The current study is the first to examine the association between alcohol-specific parenting and adolescent alcohol use, mediated by adolescent alcohol cognitions. Further, since the sample in this study consists of early adolescents, it provides an opportunity to examine these processes right before the majority of adolescents start drinking. The hypotheses was that strict alcohol-specific rules, high quality alcohol-specific communication, less parental alcohol use and more communication of parents with their children about their own use were all related with less adolescent alcohol use. Further, we explored whether all of the above-mentioned parenting factors were related to higher refusal self-efficacy, more negative alcohol expectancies and less positive alcohol expectancies. We hypothesized that higher refusal self-efficacy, more negative alcohol expectancies and less positive alcohol expectancies were related to less adolescent alcohol use. Finally, we explored whether the link between alcohol-specific parenting and adolescent alcohol use was mediated by adolescent alcohol cognitions. We expected these effects to remain significant when controlling for gender and educational level, both of which are frequently associated with alcohol use (Bloomfield, Grittner, Kramer, & Gmel, 2006; Moore et al., 2005).

## Method

### Procedure

After approval of the ethical committee of the Faculty of Social Sciences at the Radboud University Nijmegen (ECG16092010), elementary schools in the northern regions of the Netherlands were asked to distribute recruitment letters among sixth grade children (11-12 years old) and their mothers (for details see Mares, Van der Vorst, Lichtwarck-Aschoff, et al., 2011). A total of 1,395 parents and their children gave their informed consent by returning the signed response letter. Of these, 1349 fulfilled the eligibility criteria: a) being able to read and write Dutch, b) the child being in sixth grade, c) the adult being the mother or female guardian of the child, and took part in the baseline survey. Data were collected in April through May 2011, when parents and their children received separate emails with a link to their personal questionnaire in a secured web environment.

## Participants

Adolescents (50.9% male) had a mean age of 11.62 (SD = .58, range = 9–14). After leaving elementary school, 29.5% was advised to follow a low educational track, 39.2% was advised to follow an intermediate educational track, and 31.3% of the adolescents was advised to follow a high or pre-university educational track. Most mothers and their children were of Dutch origin (> 95%). Mothers' (or female guardians') age ranged from 30 to 64 years (M = 42.87, SD = 4.21).

## Measures

**Parenting measures.** All parenting measures were based on adolescent reports, because the way children experience parenting appears to be a better predictor for their own behavior compared to parent reports (Chassin et al., 2005), and also since parent reports on their own parenting practices might be more biased than adolescent reports (Cook & Goldstein, 1993; Engels, Finkenauer, Meeus, & Deković, 2001)

**Alcohol-specific rules.** A 10-item scale of Van der Vorst et al. (2005), which proved to be valid and reliable, was used to assess adolescents' view on parental alcohol-specific rules. Response categories ranged from 1 = *completely applicable* to 5 = *not applicable at all*. Scores were recoded such that a higher score represented more strict rules towards adolescents' alcohol use. Alpha was .82.

**Quality of alcohol-specific communication.** Six items such as "My mother and I talk easily about our opinions regarding drinking", and "If we are talking about alcohol use, my mother takes me seriously" were used to assess the quality of maternal communication about alcohol (Spijkerman et al., 2008). Responses were on a five point Likert scale, ranging from 1 = *completely untrue* to 5 = *completely true*, with a higher score reflecting high quality of communication. Alpha was .65.

**Frequency of alcohol-specific communication.** A Dutch translation of the alcohol-specific communication scale of Ennett, Bauman, Foshee, et al. (2001) was used to assess how many times mothers talked about eight specific domains of alcohol in the last 12 months. Response categories ranged between 1 = *never* to 5 = *very often*. Alpha was .89.

**Disclosure about parental alcohol use.** Four items were used to assess whether mothers talk about their own and their children's fathers alcohol in the past and the present. Adolescents' responses ranged from 1 = *completely untrue* to 5 = *completely true*, with higher scores reflecting more communication about parental alcohol use. Alpha was .90.

## Parent measures

**Maternal alcohol use.** Parents reported on the frequency of their own alcohol use in the past four week with one item, responses ranging from 1 = *have not been drinking* to 6 = *every day* (Engels & Knibbe, 2000). Intensity of alcohol use during the previous week was assessed by asking about the number of alcoholic beverages drank during weekdays and

weekend, both home and outside the home (Engels et al., 1999). Sum scores of these four items indicated the total number of alcoholic drinks consumed in a week.

## Adolescent measures

**Self-efficacy.** Children's ability to refrain from drinking in differing situations was measured with six items on a six point Likert scale ranging from 1 = *very difficult* to 6 = *very easy* (De Vries, Dijkstra, & Kuhlman, 1988; Engels, Wiers, Lemmers, & Overbeek, 2005). A higher score on items like "To think of a reason to say no to a glass of alcohol is..." indicated higher self-efficacy to refrain from drinking. Alpha was .86.

**Alcohol expectancies.** To measure alcohol expectancies, the negative and positive subscales of the adjusted Dutch translation of the Alcohol Expectancies Scale for Children (Dunn & Goldman, 1996) were used. Adolescents were asked whether they think adults become for example friendly or mean when they drink alcohol, with response categories ranging from 1 = *never* to 4 = *always*. An exploratory factor analysis confirmed a positive and negative expectancies subscale. Factor loadings ranged between .66 and .82, and alphas were .84 for the positive subscale and .89 for the negative subscale.

**Adolescent alcohol use.** Alcohol use of the adolescent was assessed by asking the adolescent whether he or she ever drank alcohol. Answer categories were 0 = *no, never*, 1 = *yes, 1 sip or more*.

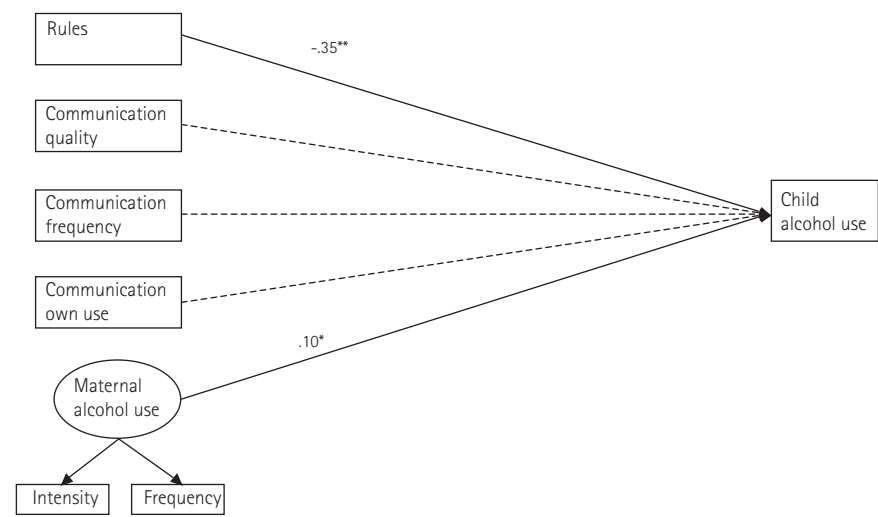
## Strategy of analyses

First, means, standard deviations and bivariate correlations of all model variables were calculated. Second, the association between alcohol-specific parenting variables, alcohol cognitions of the adolescent, and adolescent alcohol use was examined using structural equation models (SEM) with Mplus (Muthén & Muthén, 1998–2010; See Fig. 1 for the conceptual models). While testing this model, adolescent gender, and adolescent and mother educational level (middle and high level of education as dummy variables and low level of education as reference) were accounted for. In this model, standard errors were adjusted for clustering. Parameters in the model were tested using the weighted least square method with mean- and variance-adjusted chi-square test statistics (WLSMV), which handles missing data by using pairwise deletion. The latent factor of alcohol use of mothers was measured by two indicators: frequency and intensity of drinking. Factor loadings were .85 and .94, indicating an adequate assessment of the latent factors by the manifest variables. All other model variables were manifest<sup>1</sup>. The dependent variable, adolescent alcohol use, was a dichotomous variable. All other variables were continuous.

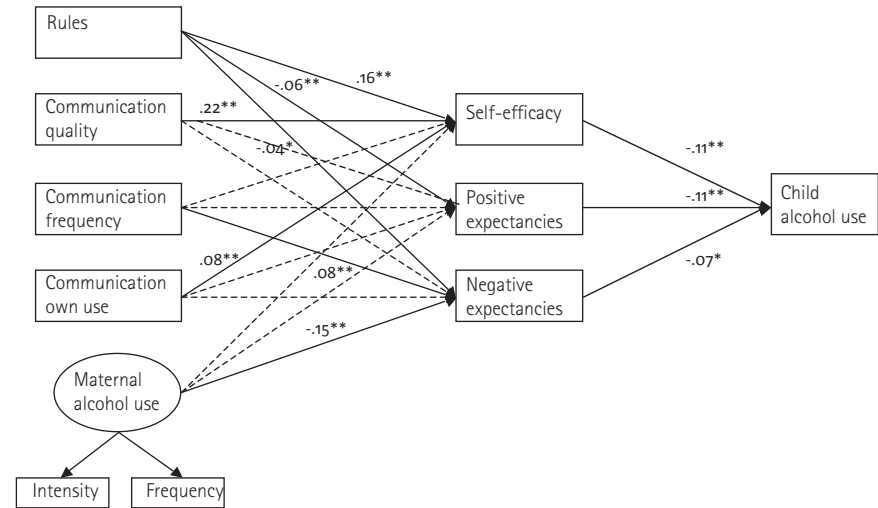
<sup>1</sup> To reduce possible error, a measurement model was computed in which each variable was represented as a latent factor identified by several parcels, which each consisted of two or three items. This measurement model showed satisfactory fit to the data ( $\chi^2(296) = 906.35, p < .001$ ; CFI = .97; RMSEA = .04), with factor loadings ranging between .60 and .93. We computed an identical SEM model as the SEM model using manifest variables, which produced nearly identical results.

Figure 1 Conceptual model of parental factors related to child factors.

A. The Direct Paths



B. The Indirect Paths



Note. Black lines indicate significant paths, dashed lines indicate insignificant paths. \*  $p < .05$ , \*\*  $p < .01$ .

Table 2 Correlations, means and standard deviations of all model variables

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Rules	4.87	.27									
2. Quality of communication	4.11	.63	.12**								
3. Frequency of communication	2.28	.87	.12**	.23**							
4. Communication about own use	2.45	1.09	.03	.21**	.19**						
5. Maternal alcohol use (Intensity)	3.54	4.73	-.03	-.08*	-.07*	-.00					
6. Maternal alcohol use (Frequency)	2.45	1.39	-.03	-.05*	-.06*	.01	.80***				
7. Self-efficacy	4.91	.99	.19**	.27**	.12**	.14**	.01	.01			
8. Positive expectancies	1.92	.48	-.06	.01	-.01	-.01	.00	-.00	-.01		
9. Negative expectancies	2.16	.56	.06	.07*	.11**	.03	-.12**	-.15**	.04	.19**	
10. Child alcohol use	.49	.50	-.26**	-.12**	-.06*	-.00	.08**	.07**	-.16**	.09**	-.08**

Note: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Model fit was assessed by the following fit indices:  $\chi^2$ , CFI, and RMSEA (Hu & Bentler, 1999). Path estimates for the continuous and dichotomous dependent variables are reported as respectively standardized linear and standardized probit regression coefficients. Probit coefficients differ from linear coefficients in that they indicate the change in the cumulative normal probability of the dependent variable, given that the predictor increases with one unit. Third, mediation effects were tested in Mplus, using the bootstrap method with bias-corrected bootstrap confidence intervals (Muthén & Muthén, 1998-2010), following the method proposed by Zhao, Lynch, and Chen (2010). This resampling method has no distributional assumptions, has high statistical power, and is very accurate in estimating Type I error rates (MacKinnon, Lockwood, & Williams, 2004).

## Results

### Descriptive statistics

Of the adolescents, 51.4% reported they never drank alcohol yet, while 48.6% reported that they drank one sip or more. Table 1 shows the means, standard deviations, and correlation of and between all model variables. All alcohol-specific parenting variables were related to self-efficacy, while none of them were related to positive expectancies, and quality and frequency of communication were related to negative expectancies. All alcohol-related cognitions were related to adolescent alcohol use. Of the parent variables, all but disclosure about parental alcohol use were associated with adolescent alcohol use.

### Basic model

The basic model (Figure 1) showed a good fit to the data ( $\chi^2(10) = 12.38$ ,  $p = .26$ ; CFI = 1.00; RMSEA = .01; Table 2). With regard to the direct links between the independent variables and the outcome, strict alcohol-specific rules was related to less adolescent alcohol use and high quality of alcohol-specific communication was marginally significant related to less adolescent alcohol use. Frequency of alcohol-specific communication and communication about own alcohol use were not associated to adolescent alcohol use. Of the control variables, being a boy was positively associated with alcohol use ( $\beta = -.14$ ,  $p < .001$ ).

Next, associations between independent variables and mediators were assessed (Table 2, Figure 1). Strict alcohol-specific rules were related to higher self-efficacy, more negative and less positive expectancies about alcohol. Quality of alcohol-specific communication and disclosure about parental alcohol use were positively related to high self-efficacy. Frequency of alcohol-specific communication was positively related to negative expectancies regarding alcohol use, while more maternal alcohol use was associated with less negative expectancies. Of the control variables, higher educational level of the child was associated with higher self-efficacy ( $\beta = .06$ ,  $p = .017$ ), while being a girl was associated with more positive ( $\beta = .07$ ,  $p = .014$ ) as well as negative expectancies ( $\beta = .06$ ,  $p = .043$ ). Last, the

**Table 2** Standardized estimates, standard errors and  $p$ -values of the direct effect parameters in the models

		$\beta$	SE	$p$
<i>Effects from independent variables on outcome</i>				
Rules	- Child alcohol use	-.35	.02	.00
Communication quality	- Child alcohol use	-.06	.03	.09
Communication frequency	- Child alcohol use	.00	.04	.99
Communication own use	- Child alcohol use	.04	.04	.24
Maternal alcohol use	- Child alcohol use	.10	.04	.01
<i>Effects from independent variables on mediators</i>				
Rules	- Self-efficacy	.16	.02	.00
Communication quality	- Self-efficacy	.22	.02	.00
Communication frequency	- Self-efficacy	.04	.03	.15
Communication own use	- Self-efficacy	.08	.03	.00
Maternal alcohol use	- Self-efficacy	.04	.03	.24
Rules	- Positive expectancies	-.06	.02	.00
Communication quality	- Positive expectancies	.01	.03	.68
Communication frequency	- Positive expectancies	-.00	.03	.97
Communication own use	- Positive expectancies	-.01	.03	.67
Maternal alcohol use	- Positive expectancies	-.01	.03	.75
Rules	- Negative expectancies	.04	.02	.02
Communication quality	- Negative expectancies	.02	.03	.38
Communication frequency	- Negative expectancies	.08	.03	.00
Communication own use	- Negative expectancies	.01	.03	.70
Maternal alcohol use	- Negative expectancies	-.15	.03	.00
<i>Effects from mediators on outcome</i>				
Self-efficacy	- Child alcohol use	-.11	.03	.00
Positive expectancies	- Child alcohol use	.11	.03	.00
Negative expectancies	- Child alcohol use	-.07	.03	.03

mediators, high self-efficacy, low positive and high negative expectancies were associated with adolescent alcohol use.

### Mediation

Mediation tests with the bootstrapping method showed that the associations between frequency of communication and adolescent alcohol use (estimate =  $-.007$ ; CI =  $-.019 - .001$ ) and between maternal alcohol use and adolescent alcohol use (estimate =  $.003$ ; CI =  $.000 - .006$ ) were mediated by negative expectancies of the adolescent towards alcohol. The associations between quality of communication and adolescent alcohol use (estimate =  $-.040$ ; CI =  $-.073 - .015$ ), alcohol-specific rules and adolescent alcohol use (estimate =  $-.066$ ; CI =  $-.134 - .029$ ), and disclosure about parental alcohol use and adolescent alcohol use (estimate =  $-.008$ ; CI =  $-.018 - .003$ ) were mediated by self-efficacy.

### Discussion

The goal of the present study was to examine the mediating role of adolescent alcohol-related cognitions in the association between alcohol-specific parenting and adolescent alcohol use. The results confirmed those of previous studies in showing that strict alcohol-specific rules (e.g., Koning et al., 2010; Monshouwer et al., 2003) and maternal alcohol use (Duncan, Duncan, et al., 2006; Otten, Van der Zwaluw, Van der Vorst, & Engels, 2008) were directly associated with life-time alcohol use in early adolescents. Higher drinking refusal self-efficacy, less positive and more negative alcohol-related expectancies were related to less adolescent alcohol use, which is in line with our expectations and with prior research (Baldwin, Oei, & Young, 1993; Komro et al., 2001). This is the first study to examine the link between alcohol-specific parenting and adolescent alcohol-related cognitions. Results showed that strict alcohol-specific rules were related to higher adolescent self-efficacy. While bivariate correlations showed that there was no association between rules and expectancies, when taking away error by controlling for other, related variables in the full model, strict rules showed a small but significant association with less positive and more negative expectancies. Better quality of alcohol-specific communication and more disclosure about parental alcohol use were both related to higher self-efficacy in adolescents. Lower frequency of communication and more maternal alcohol use were associated with less negative expectancies about alcohol among adolescents.

With regard to the main point of interest of this study, the mediating role of alcohol related cognitions in the link between alcohol-specific parenting and adolescent alcohol use, results showed that none of the links were mediated by positive alcohol-related expectancies. Links that were mediated by negative expectancies were those between frequency of communication, maternal alcohol use and adolescent alcohol use. Self-efficacy indeed mediated the link between quality of communication, alcohol-specific rules,

disclosure about parental alcohol use and adolescent alcohol use. This indicated that the way in which some of the most important alcohol-specific parenting practices affect adolescent alcohol use can be explained by adolescents drinking refusal self-efficacy.

With regard to adolescent alcohol use, drinking refusal self-efficacy has previously been shown to be most important with regard to the choice whether or not to drink, while alcohol expectancies are more related to the amount of alcohol consumed (Baldwin et al., 1993; Lee & Oei, 1993). In the present study, adolescent cognitions were related to whether or not the adolescents ever drunk any alcohol, not how much alcohol they drank, since these adolescents were rather young and therefore showed little variation on drinking intensity. The mediating effects in the present study on negative alcohol expectancies were rather small compared to the effects on drinking refusal self-efficacy. However, in accordance with Campel and Oei (2010), this mediating association was found for negative expectancies on the link between maternal alcohol use and adolescent alcohol use. In conclusion, self-efficacy appeared to be the main mediator for the link between several relevant alcohol-specific parenting practices such as rule-setting and quality of communication and whether or not adolescents ever drank alcohol.

The results do point to a difference in the association between parenting and positive versus negative alcohol expectancies. Frequency of alcohol-specific communication was related to negative alcohol expectancies, while it was not related to positive alcohol expectancies. This might indicate that when parents communicate with their children about alcohol, the message they transfer to their children with regard to alcohol is mainly focused on the negative aspects of alcohol use. Indeed, one can imagine that when parents do discuss alcohol with their children it is aimed at explaining the dangers of drinking alcohol and the challenges adolescents might encounter when trying to refuse drinking alcohol. Since not many parents would presumably encourage their children to drink alcohol, it seems plausible that the association between frequency of communication and positive expectancies is absent.

This study was the first to take a look at the association between parental disclosure about their own alcohol use towards their children and alcohol-related cognitions and alcohol use. Since parental disclosure during conversations is related to good quality of parent-child communication and is related to higher self-esteem and problem solving (Noller & Callan, 1990; Xiao et al., 2011), we expected that high parental disclosure during conversations about alcohol would be related to more anti-alcohol cognitions and less adolescent alcohol use. While parental disclosure about their alcohol use was not directly related to adolescent alcohol use, more parental disclosure about their alcohol use was related to higher drinking refusal self-efficacy, which was in turn related to less adolescent alcohol use, even when general quality of alcohol-specific communication was taken into account. Unfortunately, we did not have any information on the exact content of parental disclosure about their alcohol use. It might be interesting to know whether parents disclose about the positive or negative aspects of their alcohol use, since previous studies showed



that the content of parental disclosure is related to adolescent outcomes. For example, when parents disclose stressful information to their children, these children experience more psychological distress (Lehman & Koerner, 2002). However, the results are a first indication that even during communications about alcohol, openness on the parents' side might be relevant in preventing adolescents from (being vulnerable to) drinking alcohol.

While the present study provides a first insight into the link between alcohol-specific parenting and adolescent alcohol use mediated by alcohol related cognitions, our data is cross-sectional. Longitudinal research is warranted to test the causal order between concepts. Second, while the sample includes families from different educational backgrounds, they voluntarily signed up for an alcohol prevention program, probably lowering the chances of participation of at-risk families with regard to alcohol use problems. Indeed, the mean number of alcoholic drinks a week for women in the general Dutch population is 4.2 (www.cbs.nl), while the mean number of alcoholic drinks a week for women in this study was 3.5. Therefore, the results cannot be generalized to vulnerable families regarding alcohol as easily as they can be generalized to the general population. Third, due to several reasons (see Mares, Van der Vorst, Lichtwarch-Aschoff, et al., 2011), this study only examined the association between parenting practices of mothers and adolescent factors. Future research should also focus on fathers, especially with regard to communication, since fathers tend to communicate with their children less often (Van der Vorst et al., 2005) and show less understanding towards their children (Noller & Callan, 1990). Therefore, one could expect different associations between fatherly parenting and adolescent alcohol use. Even so, research showed that as fathers and mothers may show subtle differences in how they affect their children, they are both equally important socializing agents (Mares, Van der Vorst, Engels, et al., 2011). Last, while this study focused on early adolescents, thereby providing opportunity to examine alcohol-related processes right before the majority of adolescents start drinking, this also resulted in low variance on some of the parenting variables. Since these adolescents are approximately 11-12 years old, parents are still very restrictive of their children's alcohol use. Also, alcohol use is probably not yet a topic of heated discussion, resulting in high reports on quality of communication. The low variance on both these variables should be taken into account when interpreting these results and future research should follow adolescents longitudinally when they transcend into middle adolescence and alcohol use becomes a clear issue in their lives.

Given these limitations, the results provide some first insight into the process through which alcohol-specific parenting can be related to adolescents' alcohol use. Clearly, while parenting might not always be directly related to adolescent alcohol use, these effects might be present when one also takes adolescent cognitions, especially self-efficacy, into account. Parenting practices which might be most profoundly related to drinking-refusal self-efficacy of their children are alcohol-specific rules and quality of alcohol-specific communication, including disclosure about parental own alcohol use. Since improving drinking refusal self-efficacy can prevent adolescents from (binge) drinking early and often

(e.g. Connor et al., 2011; Scheier, Botvin, Diaz, & Griffin, 1999), these results can inform prevention workers, who can encourage parents to engage in high-quality, high-disclosure alcohol-specific conversations with their children in which they also set strict alcohol-specific rules for them. Also, since parenting is related to adolescent alcohol use through adolescent cognitions, it might be worthwhile to start prevention at an early age, when these cognitions can still be formed and modified.

## Chapter 6

Parental alcohol use, alcohol-related problems, and alcohol-specific attitudes, alcohol-specific communication, and adolescent excessive alcohol use and alcohol-related problems: An indirect path model



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## Abstract

Alcohol-specific parent-child communication has often been studied in relation to regular alcohol use of adolescents. However, it might be as important to focus on adolescent problematic alcohol use. In addition, the way parents communicate with their children about alcohol might depend on their own (problematic) drinking behaviors. Therefore, the current study examined the direct effects of parental alcohol use, alcohol-related problems, and parental alcohol-specific attitudes on adolescent excessive drinking and alcohol-related problems later in life. It also looked at indirect effects via alcohol-specific communication. The sample consisted of 428 Dutch families including fathers, mothers and adolescents from two age groups (13 and 15 years old) at T1, who have been surveyed annually for 5 years. We tested the model with Structural Equation Modeling (SEM). The results showed that parental alcohol-related problems were positively associated with communication about alcohol, which in turn was related with less excessive adolescent drinking and alcohol-related problems. Lenient parental attitudes about alcohol and parental alcohol-related problems were directly related to more excessive drinking and alcohol-related problems in adolescents. In conclusion, alcohol-specific communication intervenes in the relationship between parental alcohol-related problems and adolescent excessive drinking and alcohol-related problems. This indicates that in family alcohol interventions targeted at youth alcohol use, parental alcohol-related problems should be taken into account.

## Introduction

Many European and North-American prevention programs advocate parent-child communication to reduce adolescents' alcohol use (Brody et al., 2006; Komro et al., 2008; Mason et al., 2009; Riggs, Effenbaum, & Pentz, 2006; Robertson, David, & Rao, 2003; Rueter, Conger, & Ramisetty-Mikler, 1999; Smit et al., 2008). As part of promoting good and solid parent-child bonds, these prevention programs teach parents to talk with their children about alcohol. However, research on the link between alcohol-specific parent-child communication and adolescent alcohol use showed that familial communication about alcohol might not always be effective in preventing adolescent drinking (Ennett, Bauman, Foshee, et al., 2001; Martyn et al., 2009; Van der Vorst, Burk, et al., 2010). Therefore, more research is required into which family aspects lead to effective parental communication in lowering adolescents' alcohol consumption. The present study examined the link between alcohol-specific communication and adolescents' excessive alcohol use and alcohol-related problems while taking parental drinking and attitudes into account.

### Parental factors related to alcohol-specific communication

One of the missing links regarding alcohol-specific communication and adolescents' excessive alcohol use is to examine why or which parents communicate intensively with their offspring on alcohol matters. Although it is known that adolescent drinking positively affects how frequently parents talk with their offspring about drinking, at least for boys (Van der Vorst, Burk, et al., 2010), previous studies did not pay attention to other factors influencing the frequency of communication. However, there are ample studies on general parenting practices such as support and control indicating that parents lack in their parenting when drinking excessively. That is, parental control and monitoring are negatively affected by parental alcohol-related problems or heavy alcohol use (Blackson et al., 1999; Chassin, Pillow, Curran, Molina, & Barrera, 1993; King & Chassin, 2004; Lang, Pelham, Atkeson, & Murphy, 1999; Tildesley & Andrews, 2008). Parents who were intoxicated in an experimental setting were less accurate in perceiving problems in children, and were less consistent in their control strategies (Lang et al., 1999). Parental alcohol use has a negative effect on positive parenting as well (Tildesley & Andrews, 2008), with parents using alcohol expressing less support and providing less structure (Barnes, Reifman, Farrell, & Dintcheff, 2000; Engels, Vermulst, Dubas, Bot, & Gerris, 2005). These studies reveal that parent's alcohol-related problems negatively affect the parent-child interaction and child rearing styles. It seems plausible that a parenting practice like alcohol-specific communication would be affected in a negative way by parental alcohol-related problems.

Besides parental alcohol-related problems, normative parental alcohol use and parental alcohol-specific attitudes are likely to determine the way parents communicate with their adolescents about alcohol as well. Normative alcohol use of parents has been shown to be related negatively to general parenting (Tildesley & Andrews, 2008) and alcohol-specific

parenting (Van Zundert et al., 2006). Moreover, parental alcohol use and strict alcohol-specific attitudes show a strong negative association (Koning et al., 2010; Payne, Govorun, & Arbuckle, 2008; Stacy, Bentler, & Flay, 1994; Van der Vorst et al., 2006). Since strict parental attitudes towards alcohol use of their adolescents are positively associated with general parenting strategies like parental support and monitoring (Wood, Read, Mitchell, & Brand, 2004), a positive link between strict alcohol-specific attitudes and more alcohol-specific communication is to be expected, but has yet to be shown.

### Factors related to adolescents' excessive drinking and alcohol-related problems

There is a large body of research on the association between parenting, parental alcohol use and adolescent alcohol use. It is well known that, for example, parental alcohol use increases the risk of initiation and the intensity of later adolescent alcohol use (Tildesley & Andrews, 2008; Van Zundert et al., 2006). The same has been shown for the association between parental alcohol-related problems and adolescent drinking (Blackson et al., 1999; Van der Zwaluw et al., 2008). In addition, when parents endorse negative alcohol-specific attitudes it prevents engagement in excessive alcohol use of their adolescent off-spring (Aas & Klepp, 1992; Miller & Plant, 2003). Regarding the association between alcohol-specific communication among parents and their children and the alcohol use of the adolescents, inconsistent findings have been shown (Ennett, Bauman, Foshee, et al., 2001; Ennett et al., 2008; Martyn et al., 2009; Van der Vorst, Burk, et al., 2010). Further, these studies examined non-problematic alcohol use of adolescents. It is essential to further assess the association between alcohol-specific communication and adolescents' alcohol use. Since excessive alcohol use leads to most deviance during adolescence and later adulthood (e.g., Brown et al., 2008), it is important to examine alcohol-specific communication in relation to excessive alcohol use and alcohol-related problems of adolescents.

### Distinction between paternal and maternal effects

Studies that focus on parental alcohol use and alcohol-specific parenting have shown clear distinctions between maternal and paternal behaviors (Van der Vorst et al., 2005). For example, women use alcohol less frequently and intensively and encounter fewer problems due to their drinking than men (Cooper, Russell, Skinner, Frone, & Mudar, 1992; Nolen-Hoeksema, 2004). Besides their alcohol use, parents' strategies to prevent their children from using alcohol differ. Mothers are more likely to initiate conversations about alcohol (Van der Vorst, Burk, et al., 2010; Van der Vorst et al., 2005) and show more understanding towards the opinion of their children (Noller & Callan, 1990). In contrast, fathers have more lenient attitudes towards adolescent drinking (Pettersson, Linden-Bostrom, & Eriksson, 2009). In addition to general gender differences in parental drinking and parenting, the impact of them on adolescent drinking can also vary for fathers and mothers. Paternal alcohol use seems to have a stronger positive impact on adolescent alcohol use as compared to maternal alcohol use (Chassin, Curran, Hussong, & Colder, 1996; Van der Vorst et al.,

2009; Zhang, Welte, & Wieczorek, 1999), while attitudes of fathers and mothers regarding adolescent alcohol use do not differ in effectiveness in reducing adolescent drinking (Van der Vorst et al., 2006). All together, these findings indicate that it is relevant to test for paternal and maternal differences in relation to alcohol-related behaviors.

### Present study

The present study examined the role of parental alcohol use, parental alcohol-related problems, and alcohol-specific attitudes towards youth alcohol use in alcohol-specific communication. Subsequently, the association of alcohol-specific parent-child communication with adolescent excessive alcohol use and alcohol-related problems was examined<sup>1</sup>. We expected that more parental alcohol use, more parental alcohol-related problems and tolerant alcohol-specific attitudes of parents are related to less alcohol-specific communication with adolescents. In turn, we expected that more frequent alcohol-specific communication leads to more excessive alcohol use and alcohol-related problems in adolescents. Besides these indirect effects, the direct effects of all independent variables on adolescent excessive alcohol use and alcohol-related problems were tested. We hypothesized that more parental alcohol use, more parental alcohol-related problems, and tolerant alcohol-specific attitudes lead to more excessive alcohol use and alcohol-related problems in adolescents. Finally, these models were tested for mothers and fathers separately. See Figure 1 for both the indirect and the direct path model.

## Method

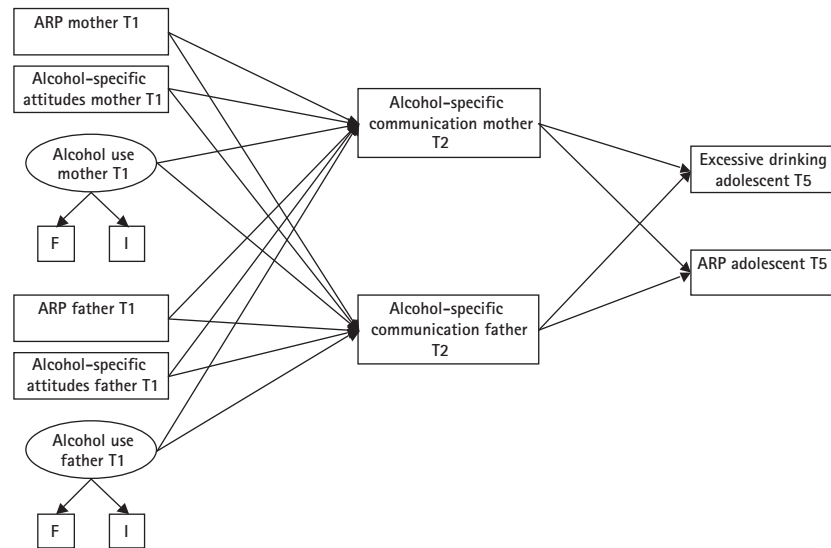
### Procedure

Data used in this study come from a longitudinal project called "Family and Health" (Harakeh, Scholte, de Vries, & Engels, 2005; De Leeuw, Engels, Vermulst, & Scholte, 2009). A total of 5400 Dutch families including at least two children aged 13-16 years were mailed to ask for their participation in the study. The addresses of these families were obtained from the records of 22 Dutch municipalities. All of the 885 families who agreed to participate were phoned to ascertain whether they fulfilled the criteria of (I) parents living together or being married, (II) parents and adolescents being biologically related, (III) siblings not being a twin, and (IV) none of the children being physically or mentally disabled. Families with members that were not able to read or write in Dutch were also excluded, resulting in a

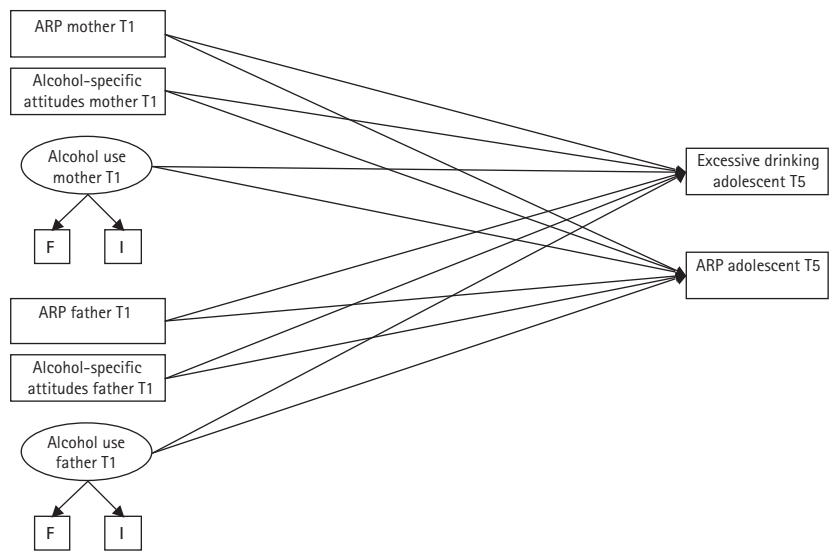
<sup>1</sup> The association between alcohol-specific communication and adolescent alcohol use has been previously examined using data from the "Family and Health" study (Van der Vorst et al., 2005; Van der Vorst, Burk, et al., 2010), while this study takes a new perspective by looking at parental alcohol use and alcohol-specific attitudes in relation to adolescent excessive drinking and alcohol-related problems. Data of wave 5 instead of wave 3 and 4 was used due to lack of information on adolescent excessive drinking and alcohol-related problems on these two waves.

**Figure 1** Conceptual model of parental factors in relation to adolescent factor.

**A. The Direct Paths**



**B. The Indirect Paths**



Note. ARP = alcohol-related problems.

sample of 765 families who fulfilled all entry criteria. On the basis of adolescents' education level and sibling dyads (i.e. boy-boy, boy-girl, girl-girl, girl-boy), a further selection was made resulting in an equal division of both criteria. The final sample comprised 428 families consisting of both parents and two adolescent children at baseline measurement (T1). A total of 416 families participated at the second wave (T2), and 325 families participated three years later at time 5 (T5), which resulted in a response rate of 76% over the waves.

A trained interviewer visited the families at home at each time point. All four family members individually filled out a wide-ranging questionnaire at home in five annual waves with a yearly interval, starting in November 2002. Respondents were not allowed to discuss the questions or answers with each other. After all four family members completed the questionnaire each family received 30 Euros per wave. After the third wave, 5 families were selected to receive a travel check worth €1000. The current study used the data of the first two waves to tap predictor variables. Adolescent outcomes were assessed at the fifth wave, as both adolescents were only asked about their problematic alcohol use at this measurement point.

**Participants**

Of the participating parents at the first wave, 95% were of Dutch origin. At the first wave the age of the mothers ranged from 35 to 56 years ( $M = 43.82$ ;  $SD = 3.57$ ) and the age of the fathers ranged from 37 to 62 years ( $M = 46.18$ ;  $SD = 4.00$ ). The majority of mothers finished elementary school or a low educational level of Dutch secondary school (50.4%), 44.2% finished vocational education, while the remaining 5.4% finished college or university. Of the fathers, 42.1% and 40.4% finished respectively elementary school or a low educational level of secondary school, and vocational education, while 17.5% finished college or university. The mean age of the younger adolescents was 13.36 years ( $SD = .50$ ) and that of the older adolescents was 15.22 years ( $SD = .60$ ). At baseline, approximately one third of younger and older adolescents followed special or low education (37.2% and 31.0% respectively), one third followed an intermediate general education (36.0% and 29.3% respectively), and the remaining one third followed the highest level of secondary school, which is preparatory college and university education (26.9% and 39.7% respectively).

An attrition analysis was conducted to check whether families that completed 5 measurement waves differed compared to families that dropped out. A logistic regression analysis showed that families who completed all measurements ( $n = 325$ ) did not differ from the drop-outs ( $n = 103$ ) in age, gender and educational level, except for educational level of the younger adolescents (odds ratio [OR] = 1.84,  $p = .00$ , 95% confidence interval [CI]: 1.25, 2.69). Younger adolescents who followed the higher educational level of the Dutch secondary school system were less likely to drop out. The Cox and Snell indicator of explained variance was .07, indicating that the model variables predicted limited variance in attrition.



## Measures

**Parental alcohol consumption.** At T1, parents were asked about the frequency of their alcohol use in the past four weeks with one item. The response categories ranged from 1 = *have not been drinking* to 6 = *every day* (Engels & Knibbe, 2000). Intensity of drinking was assessed by asking the parents about the number of alcoholic beverages they drank in the previous week. This scale contains 4 items, targeted on alcohol use during weekdays and weekend, both home and outside the home (Engels et al., 1999). Of these four items, sum scores were used as an indication of the total number of alcoholic drinks consumed in a week.

**Parental alcohol-related problems.** The problem drinking list of Cornel, Knibbe, Van Zutphen, and Drop (1994), which consisted of 18 items, was used to measure the severity of parental alcohol-related problems at T1. The items form a reliable and unidimensional scale (Cornel et al., 1994). Response categories ranged from 1 = *never* to 5 = *very often*. To achieve congruence with the original scale (Cornel et al., 1994), these categories were transformed into 0 = *no* or 1 = *yes*, with 0 representing a score of 1 and 1 representing a score ranging from 2 to 5. Of this scale, sum scores were computed. This division is often used and has been shown to be reliable and valid (Van der Zwaluw et al., 2008). Some examples of items are: "Do you ever drink alcohol to forget your concerns?" and "Have you ever lost your job because of your drinking?" A high sum score on this scale reflected more severe alcohol-related problems. Alphas for this scale were satisfactory: .74 for mothers and .70 for fathers.

**Parental alcohol-specific attitudes.** Seven items of a Dutch translation of the Alcohol Use Norms Scale (Brody, Flor, Hollett-Wright, McCoy, & Donovan, 1999; Van der Vorst et al., 2006) were used to assess parental attitudes about drinking of 13-years olds at T1. The response categories ranged from 1 = *totally unacceptable* to 5 = *totally acceptable*. A higher mean score on this scale reflected more liberal attitudes toward youth drinking. Some examples of items are: "How acceptable is it for a 13-year-old boy/girl to have a small glass of wine during a family dinner" and "How acceptable is it for a 13-year-old boy/girl to get drunk when drinking alone". We asked the parents about alcohol-specific attitudes of boys and girls separately. However, because these scores showed high correlations (.94 for mothers and .95 for fathers), we computed them into one variable for the mothers and one variable for the fathers. These scales had a high internal consistency:  $\alpha = .83$  for mothers and  $\alpha = .85$  for fathers.

**Alcohol-specific communication.** The alcohol-specific communication scale of Ennett, Bauman, Foshee, et al. (2001) has been translated in Dutch and used to assess eight specific domains of parent-child communication on alcohol at T2 (Van der Vorst et al., 2005); The domains were 1) negative consequences of use, 2) peer pressure resistance, 3) encouragement to choose non-drinking friends, 4) media portrayal of alcohol, 5) encouragement not to use, 6) telling the adolescent not to use, 7) rules about use and 8) discipline. Mothers and fathers reported for the younger and older adolescents separately

how many times they talked about these topics with their children in the last twelve months on a 5-point Likert scale ranging from 1 = *never* to 5 = *very often*. Internal consistencies were computed for all family dyads separately, resulting in alpha's ranging from .84 to .88.

**Adolescent excessive alcohol use.** At T5, adolescents were asked about their binge drinking in the past four weeks by an item concerning the frequency of having five or more drinks in a row. The response categories ranged from 1 = *never* to 7 = *9 times or more*. This question is based on a standard self-report measure of binge drinking (Schulenberg, Wadsworth, O'Malley, Bachman, & Johnston, 1996).

**Adolescent alcohol-related problems.** The Rutgers' alcohol problem index (RAPI: White & Labouvie, 1989) was used to measure adolescent alcohol-related problems. This scale, consisting of 18 items, assesses problematic situations that are related to youth alcohol use. Response categories ranged from 1 = *never* to 5 = *very often*, of which mean scores were computed. Some examples of items are: "You went to school or to work while you were still under the influence of alcohol", and "You acted unkind or got involved in a fight because you consumed alcohol." Alpha's were .90 (younger adolescents) and .88 (older adolescents).

## Strategy of analyses

First, means, standard deviations, and bivariate correlations of model variables were calculated. Second, associations between maternal and paternal drinking, alcohol-related problems, alcohol-specific attitudes, alcohol-specific communication and adolescent excessive drinking and alcohol-related problems were examined longitudinally with MPLUS version 5.1 (Muthén & Muthén, 1998-2010: see Figure 1 for the conceptual models), while controlling for adolescent alcohol use at T1.<sup>2</sup> We tested an identical model for older and younger adolescents separately. The full information maximum likelihood with robust standard errors was utilized to estimate parameters in the model (Muthén & Muthén, 1998-2010). This estimator uses a numerical integration algorithm to get a maximum likelihood estimator with robust standard errors. With missing data, the standard errors for the parameter estimates are computed using the observed information matrix (Kenward & Molenberghs, 1998). The latent factors of alcohol use of fathers and mothers were measured by two indicators: frequency and intensity of drinking. All factor loadings were above .68, indicating an adequate assessment of the latent factors by the manifest variables. All other model variables were manifest. Model fit was assessed by the following global fit indices:  $\chi^2$ , CFI, and RMSEA (Hu & Bentler, 1999).

<sup>2</sup> We tested for differences in paternal and maternal effects. These differences were mainly non-significant and therefore were not reported.



## Results

### Descriptive Statistics

On average, fathers drank alcohol more often than mothers, and they drank more glasses of alcohol per week (Table 1). Fathers also reported to experience more problems due to their drinking than mothers. Fathers and mothers did not differ in their alcohol-specific attitudes. A comparison between fathers and mothers showed that mothers communicated more frequently with their younger ( $t(412) = 4.28, p < .001$ ) and older ( $t(412) = 3.82, p < .001$ ) offspring on alcohol than fathers did. T-tests showed no differences for excessive drinking ( $t(264) = .73, p > .05$ ) and alcohol-related problems ( $t(265) = -1.17, p > .05$ ) between younger ( $M$  Binge drinking = 2.97,  $SD = 1.70$ ;  $M$  Problem drinking = 1.30,  $SD = .03$ ) and older adolescents ( $M$  Binge drinking = 3.07,  $SD = .11$ ;  $M$  Problem drinking = 1.33,  $SD = .02$ ) at T5. Correlations between the model variables are depicted in Table 2. It was found that parental alcohol-related problems were strongly associated with the frequency of parent-child alcohol-specific communication.

**Table 1** Comparison of reports on alcohol use and attitudes by fathers and mothers (paired samples t-tests)

	Fathers ( $n = 428$ )		Mothers ( $n = 428$ )	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Frequency of Alcohol Use	3.70 <sup>a</sup>	1.60	3.08 <sup>b</sup>	1.69
Intensity of Alcohol Use	12.88 <sup>a</sup>	11.29	6.09 <sup>b</sup>	6.75
Alcohol-Related Problems	1.84 <sup>a</sup>	2.18	.88 <sup>b</sup>	1.56
Attitudes	1.59 <sup>a</sup>	.43	1.55 <sup>a</sup>	.40

Note. Means in the same row that have different subscripts are significantly different ( $p < .05$ )

### Model Findings for the Younger Adolescents

The model for younger adolescents showed an acceptable fit ( $\chi^2(20) = 54.28, p = .00$ ; CFI = .97; RMSEA = .06). All standardized estimates are presented in Table 3. Findings with regard to the indirect path model, depicted in Figure 1a, revealed that maternal and paternal alcohol-related problems were positively related to parent-adolescent communication, implying that the more problems parents experience regarding their drinking, the more they talk with their children about alcohol matters. The degree to which mothers experienced problems due to drinking alcohol was also positively related to paternal communication, revealing that the higher the level of maternal alcohol-related problems, the more fathers engage in alcohol-specific communication with their offspring. Further, liberal alcohol-

**Table 2** Pearson correlations between the model variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. ARP mothers												
2. Attitudes mothers	-.16***											
3. Alcohol use mothers (I)	-.11*	.10*										
4. Alcohol use mothers (F)	-.11*	.11*	.78***									
5. ARP fathers	.68***	-.11*	.00	-.02								
6. Attitudes fathers	-.16***	.33***	.09*	.10*	-.13**							
7. Alcohol use fathers (I)	-.06	.08*	.40***	.31***	.09*	.09*						
8. Alcohol use fathers (F)	-.10*	.01	.42***	.46***	-.08*	.65***	.65***					
9. Communication mothers	.35***	-.05	-.09*	-.11*	.34***	-.17***	-.06	-.19***				
10. Communication fathers	.38***	-.05	-.06	-.10*	.41***	-.14**	-.06	-.17***	.68***			
11. Excessive drinking adolescents	.03	.16***	.13*	.18***	.08*	.17***	.22***	.20**	-.02	-.06		
12. ARP adolescents	-.14**	.12**	-.06	-.09*	-.17***	-.02	-.08*	-.01	.04	.01	-.43***	

Notes. ARP = alcohol-related problems. Younger adolescents are presented above the diagonal; older adolescents are presented below the diagonal.  
\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

**Table 3** Standardized estimates of parental drinking and attitudes in relation to alcohol-specific communication of the parents and excessive drinking and related problems of the adolescents

	Older Adolescents ( <i>n</i> = 428)	Younger Adolescents ( <i>n</i> = 428)
	$\beta$	$\beta$
<b>Indirect path model mothers</b>		
ARP mothers-communication mothers	.19***	.25***
Attitudes mothers-communication mothers	.03	.02
Alcohol use mothers-communication mothers	-.00	-.03
ARP fathers-communication mothers	.19***	.09
Attitudes fathers-communication mothers	-.11*	-.12**
Alcohol use fathers-communication mothers	-.16**	-.07
Communication mothers-excessive drinking	.07	-.03
Communication mothers-ARP	.10	-.13*
<b>Indirect path model fathers</b>		
ARP fathers-communication fathers	.28**	.20**
Attitudes fathers-communication fathers	-.08	-.12**
Alcohol use fathers-communication fathers	-.13*	-.09
ARP mothers-communication fathers	.17**	.18**
Attitudes mothers-communication fathers	.02	-.00
Alcohol use mothers-communication fathers	-.01	.01
Communication fathers-excessive drinking	-.14*	-.05
Communication fathers-ARP	.06	.02
<b>Direct path model mothers</b>		
ARP mothers-excessive drinking	.00	-.02
Attitudes mothers-excessive drinking	.11*	.05
Alcohol use mothers-excessive drinking	.02	.00
ARP mothers-ARP	-.08	.01
Attitudes mothers-ARP	.05	.03
Alcohol use mothers-ARP	-.10	.02
<b>Direct path model fathers</b>		
ARP fathers-excessive drinking	.13*	.14*
Attitudes fathers-excessive drinking	.07	.11*
Alcohol use fathers-excessive drinking	.16*	.17*
ARP fathers-ARP	-.15*	.05
Attitudes fathers-ARP	.05	.04
Alcohol use fathers-ARP	.06	-.06

Note. ARP = alcohol-related problems. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

specific attitudes of the fathers were related to lower frequency of alcohol-specific communication. All the other parental factors did not predict parental alcohol-specific communication in the model of the younger adolescents. Subsequently, the more frequent mothers communicate with their offspring about alcohol, the lower the levels of adolescent alcohol-related problems were.

Findings with regard to the direct path model, depicted in Figure 1.b, showed that liberal paternal alcohol-specific attitudes and high levels of paternal alcohol use and alcohol-related problems were related to engagement of their offspring in excessive drinking. All other associations regarding younger adolescent excessive alcohol use and related problems were not significant.

### Model Findings for the Older Adolescents

The model for older adolescents showed an acceptable fit ( $\chi^2(20) = 58.08$ ,  $p = .00$ ; CFI = .97; RMSEA = .07)<sup>3</sup>. Standardized estimates are presented in Table 3. The indirect path model findings showed that maternal and paternal alcohol-related problems were significantly and positively associated with both their own alcohol-specific communication as well as the alcohol-specific communication of their partners. This means that the more alcohol-related problems their partners showed, the more fathers and mothers talked about alcohol with their children. Furthermore, paternal alcohol use was negatively related to alcohol-specific communication of the mothers and to communication of the fathers themselves. Alcohol-specific attitudes of the fathers showed a negative association with alcohol-specific communication of the mothers, indicating that strict attitudes of fathers towards youth alcohol use stimulates mothers to talk more frequently about alcohol with their children. All the other parental factors did not predict parental alcohol-specific communication in the model of the older adolescents. Subsequently, more frequent alcohol-specific communication of fathers was associated with less adolescent excessive drinking.

With regard to the direct path model, excessive drinking of the older adolescents, paternal alcohol-related problems and paternal alcohol use were positively related to excessive drinking, indicating that the higher the levels of paternal drinking and problems due to alcohol use, the more older children engaged in excessive alcohol use. Alcohol-specific attitudes of the fathers did not relate to excessive alcohol use of adolescents, whereas liberal attitudes of the mothers were related to more excessive drinking of adolescents four years later. Maternal alcohol use was not related to excessive drinking. In relation to alcohol-related problems, only those of the fathers were associated with subsequent alcohol-related problems of their adolescent children.

<sup>3</sup> The full model was also tested in the full sample including older and younger adolescents together to increase statistical power. However, these analyses decreased the fit of the model ( $\chi^2(20) = 107.155$ ,  $p = .00$ ; CFI = .96; RMSEA = .07). Further, because of possible difference due to age or birth order, analyses were conducted for younger and older adolescents separately.

## Discussion

In the present study, we tested the association between parental alcohol use and its related problems, parental alcohol-specific attitudes, and alcohol-specific parent-child communication, and the direct and indirect associations with adolescent excessive alcohol use and its related problems. Our findings revealed that parents communicate more about alcohol with their children when they experience problems due to their drinking. In general, when fathers express strict alcohol-specific attitudes, both parents talk more often about alcohol with their children. The attitudes of mothers did not show this effect. In line with this, strict paternal alcohol-specific attitudes about alcohol have a preventive effect on adolescent excessive alcohol use, while among older adolescents, maternal attitudes on alcohol prevents offspring from engaging in excessive alcohol use. Paternal alcohol use and alcohol-related problems are both related to adolescent excessive drinking. In addition, paternal, but not maternal alcohol-related problems are related to older adolescent problem drinking. Alcohol-specific communication of parents with their adolescents showed no or small negative effects on excessive alcohol use and related problems of adolescents. Among younger adolescents, more frequent communication of mothers indicated less alcohol-related problems 3 years later, while among older adolescents, more frequent communication of fathers indicated less excessive drinking.

### Parental factors and alcohol-specific communication

The positive association between parental alcohol-related problems and alcohol-specific parent-child communication is somewhat unexpected, since previous research shows a negative effect of parental alcohol use on several parenting practices (Engels, Vermulst, et al., 2005; King & Chassin, 2004; Lang et al., 1999; Tildesley & Andrews, 2008). In contrast to families in which parents drink alcohol occasionally, alcohol might be a more relevant and frequently discussed topic in families where parents experience problems due to their drinking. However, it should be noted that the exact content of the alcohol-related conversations, and perhaps more important, the quality of these conversations are yet unknown. Previous research suggests that there might be a negative link between parental alcohol use and the quality of parent-child communication about alcohol (Spijkerman et al., 2008). Therefore, future research taking alcohol-specific communication into account should ask about content and quality of these conversations. Ideally, parents and their adolescents should be observed while discussing alcohol related topics (Van der Vorst, Burk, et al., 2010). Then, the processes behind the association between communication and adolescent alcohol use can be unraveled.

### Maternal and paternal influences on adolescents' alcohol use

Another important result of this study is the difference in effects between paternal and maternal factors. While most prevention and intervention programs focus on mothers

(Brody et al., 2006; Riggs et al., 2006), it appears that fathers might have at least as much influence on their adolescents' drinking behavior as mothers. For example, paternal alcohol use and alcohol-related problems increase the likelihood that their children will engage in excessive drinking, while this association is absent for mothers. This difference between the effects of maternal and paternal drinking has been shown previously (Chassin et al., 1996; Lieb et al., 2002; Rohde, Lewinsohn, Kahler, Seeley, & Brown, 2001; Van der Vorst et al., 2009). It might be due to the fact that fathers have higher overall alcohol consumption rates. However, there might be a methodological explanation: In multivariate analysis the effect of maternal drinking may become invisible, because of high correlations between mothers' and fathers' alcohol use (Poelen et al., 2007).

In addition, the alcohol-specific attitudes of fathers were predictive of excessive drinking in young adolescents. Their attitudes also incited mothers to talk more often about alcohol with their adolescent children. This finding is in accordance with the idea that fathers might employ more indirect parenting strategies, such as holding strict attitudes, while mothers are supposed to use more direct strategies, like communication (Cabrera, Fitzgerald, Bradley, & Roggman, 2007; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004). The underlying thought of fathers exerting their influence indirectly via the mothers is that they are generally less present at home (Lewis & Sussman, 1986). Previous research indeed showed that fathers' attitudes influence maternal behaviors towards their offspring (Scott, Binns, & Aroni, 1997). Taken together, these results imply that family programs targeted on youth alcohol use should try to get fathers involved as well.

### Alcohol-specific communication as an intervening factor

While most previous studies showed a positive association between alcohol-specific communication and adolescent alcohol use (e.g., Ennett, Bauman, Foshee, et al., 2001; Van der Vorst, Burk, et al., 2010; Van der Vorst et al., 2005), this study shows a negative association. This discrepancy could be due to the fact that the current study took alcohol-related problems of the parents into account. When this factor is taken into account while controlling for parental alcohol use, the positive effect of alcohol-specific communication on alcohol use of adolescents is no longer present. This study intermittently shows that alcohol-related problems of parents lead to more communication about alcohol, which in turn leads to less alcohol-related problems of adolescents. However, alcohol-related problems of parents also lead directly to an increase in alcohol-related problems of adolescents. Because previous studies lacked information on alcohol use of parents and the problems due to this alcohol use specifically, this could explain why they showed a positive effect of alcohol-specific communication on alcohol use of adolescents (Ennett, Bauman, Foshee, et al., 2001; Van der Vorst, Burk, et al., 2010; Van der Vorst et al., 2005).

Thus, frequent communication on alcohol matters within families might be due to alcohol-related problems of parents as well as lenient alcohol-specific attitudes of fathers. This could indicate that in these families, frequent communication cannot be regarded as

positive and constructive. Therefore, promoting a good parent-child bond and constructive communication skills might be important. However, prevention programs should be reserved in promoting alcohol-specific communication until this concept and its association with adolescents' alcohol use is exactly clear. To establish good programs, future research should examine the characteristics of high-quality communication, especially concerning conversations on alcohol-related topics.

## Conclusion

To summarize, parental drinking and lenient parental alcohol-specific attitudes are positively associated with adolescent excessive alcohol use and related problems. Further, parental alcohol-related problems predict alcohol-specific parent-child communication, which in turn predicts adolescent excessive alcohol use and related problems. Parental alcohol-related problems are directly associated with more adolescent alcohol use as well. In spite of the strengths such as a longitudinal multi-informant design, limitations should be mentioned. First, the current study included a selective sample of families and therefore, the findings should not be generalized to non-traditional families such as single-parent families or families of ethnic minorities. Second, due to this selective sampling and the rather young age of the adolescents, there were very few adolescents that experienced problems related to drinking. Variance on this scale was low, which could explain the lack of findings regarding this measure. Further, the findings with regard to alcohol-specific communication may not reflect the situation in other countries besides the Netherlands. The Netherlands have a drinking culture in which adolescents drink more compared to other European countries (Hibell et al., 2004). Attitudes of parents and youth toward adolescent alcohol use are tolerant in the Netherlands. Indeed, Dutch parents are less likely to discuss or criticize the alcohol use of adolescents compared to parents in Mediterranean countries (Knibbe et al., 2007). Further, compared to the United States and the United Kingdom, alcohol is very available and very cheap in the Netherlands (Brand, Saisana, Rynn, Pennoni, & Lowenfels, 2007), which might make it more difficult for parents to keep and communicate strict attitudes towards alcohol. Last, due to a limited sample size, differences between boys and girls could not be assessed, while the model may differ for gender. For example a study of Van der Vorst, Burk, et al. (2010) showed that the effect of alcohol-specific communication on alcohol use of adolescents was especially pronounced for boys. Moreover, parents employ different communication strategies when confronting boys or girls about alcohol use (Boone & Lefkowitz, 2007).

Taking these limitations into account, our findings add substantial evidence to earlier studies about alcohol-specific communication and adolescent alcohol use by hinting to the effects of parental alcohol-related problems. Studies including samples with parents diagnosed with alcohol dependence and misuse are warranted in order to confirm these

results. Further, more research is needed on the role of for example the exact content and quality of communication within this association. As for prevention and intervention, it is important that these programs do not focus on advertising alcohol-specific communication until further research is done. Of course, promoting a good and solid parent-child bond is an important facet of any prevention program focusing on parent involvement. Further, focusing on the engagement of fathers as well as mothers is an important avenue for future programs.

# Chapter 7

Intergenerational transmission of drinking motives and how they relate to young adults' alcohol use



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## Abstract

This study examined whether parental drinking motives were associated with young adults' drinking motives, and their association with young adults' drinking behaviors. The sample consisted of 290 18 year old and 289 20 year old drinking young adults and their parents. For the younger group, stronger maternal coping motives were related to stronger social and enhancement motives, while stronger paternal coping motives were associated with stronger young adult coping motives. For the older group, stronger maternal coping motives were related to stronger social motives, and stronger paternal enhancement motives were associated with stronger overall young adult drinking motives. For the younger group, both enhancement and conformity motives were predictive of their alcohol use. For the older group, only higher social motives were predictive of higher alcohol use. Both groups' higher coping and enhancement motives were associated with more drinking problems.

## Introduction

Alcohol use, especially among adolescents and young adults, is widely recognized as being risky behavior since it is associated with various negative outcomes such as aggression, risky sexual behavior, cognitive impairments, and alcohol disorders later in life (DeBellis et al., 2000; Exum, 2006; Grant et al., 2006; Odgers et al., 2008). A large field of studies has aimed to disentangle the predictors of alcohol use (Hawkins et al., 1992; Zucker, Donovan, Masten, Mattson, & Moss, 2008; Donovan & Molina, 2011), focusing on contextual factors such as friends, family and culture, but also on individual factors, such as other problem behavior or personality. Among these many individual predictors that have been studied, the motivational model of alcohol use states that drinking motives are the most proximal ones (Cox & Klinger, 1990). According to this model, drinking motives refer to the reasons why people drink and always reflect either a positive reinforcement motive, to reach a certain outcome, or a negative reinforcement motive, to avoid a certain outcome. Further, these outcomes can be either internal, such as emotional states, or external, such as social acceptance. When these two dimensions are combined, four different classes of drinking motives can be identified (Cooper, 1994; Kuntsche, Stewart, & Cooper, 2008): Enhancement (internal positive), social (external positive), coping (internal negative), and conformity (external negative). In the literature, these four drinking motives have been differentially linked to distinct alcohol use patterns (Cooper et al., 1992; Cooper, 1994; Kuntsche et al., 2005; Ham et al., 2009).

The distinction between alcohol use patterns in general is between heavy, problematic alcohol use on the one hand and normative alcohol use on the other hand. Studies show that heavy, problematic drinking is typically related to enhancement and especially coping motives for drinking, while normative drinking is more commonly related to social motives for drinking (Cooper et al., 1992; Cooper, 1994; Kuntsche et al., 2005; Ham et al., 2009). Instead of using effective strategies such as acceptance, problem solving and reappraisal (Aldao, Nolen-Hoeksema, & Schweizer, 2011), relying on alcohol to regulate or cope with emotions can be seen as problematic and could lead to heavy or problematic drinking later in life. On the other hand, since drinking alcohol in many cultures is incorporated into social events such as dinners, parties and even rituals, it is to be expected that the majority of adolescents report social motives for drinking.

When one thinks of these social situations in which drinking alcohol is normative, probably parents serve as the first drinking reference for children. In both theory and empirical research, it is indeed suggested that parental alcohol use is a predictor of adolescent alcohol use. A vast body of research has investigated the direct effects of parental alcohol use on adolescent and young adult alcohol use (White et al., 2000; Alati et al., 2005; Duncan, Duncan, et al., 2006; Van der Zwaluw et al., 2008). In this work, modeling (Bandura, 1986) is considered the primary driving mechanism; adolescents see their parents drink and model this behavior. Recently, however, cognitive theories have suggested that



modeling is probably a more indirect process (Pajares, 1997; Zimmer-Gembeck & Collins, 2006). A child that sees his/her parents drink at birthday parties and having fun, is likely to internalize the idea that drinking alcohol is associated with having fun at parties (social drinking motive). This will eventually increase the likelihood that the child itself will be drinking at parties later. A few studies indeed showed that parental alcohol use is related to adolescent alcohol use through adolescent drinking motives (Chalder, Elgar, & Bennett, 2006; Müller & Kuntsche, 2011).

In an attempt to further define this mechanism, Campbell and Oei (2010) have put forward the hypothesis that also direct transference of alcohol cognitions (i.e., motives but also attitudes, norms and expectancies) occurs between parents and children. In other words, there is not only an indirect link between parental alcohol use and adolescent or young adult alcohol use through child's cognitions, but also an indirect link from parental alcohol cognitions to adolescent alcohol use through child's cognitions. Thus, for the child that sees his/her parents drink, it also matters why they drink and in what context they drink. These motives may sometimes be clearly 'visible' for the child (e.g., having fun at a birthday party or after a hard day at work in order to relax). The model of intergenerational transference assumes that children internalize those motives, resulting in agreement between parental and child alcohol cognitions. There is some evidence that alcohol-related norms or attitudes of parents and children are related (Brody et al., 1998; Parsai et al., 2009), although others revealed no link between parental and child alcohol expectancies (Handley & Chassin, 2009; Campbell & Oei, 2010). With regard to drinking motives, to our knowledge, there is only one study on intergenerational transmission (Windle & Windle, 2012), which indicated that for each drinking motive, mother-child and father-child reports were related. Nonetheless, Windle and Windle (2012) did not take into account conformity motives, which are important for adolescents (Cooper, 1994) and exclusively focused on motive-specific associations (i.e. coping-coping). Based on the discussed literature, we conclude that support for intergenerational transference of drinking motives needs further verification.

In the current study, we used a full family design with fathers, mothers and a younger and an older group of young adults to examine whether parental drinking motives are related to young adult drinking motives and whether these young adult motives are related to alcohol use and alcohol-related problems. We expected that social drinking motives would relate to young adult alcohol use, while coping and enhancement motives would relate to alcohol-related problems. As to the link between parental drinking motives and young adult drinking motives, this study is a first exploration of this link, and based on the mixed results of previous studies on cognitions (Brody et al., 1998; Handley & Chassin, 2009; Parsai et al., 2009; Campbell & Oei, 2010), we did not postulate an expected direction of effects.

## Method

### Study Design and Sample

The data used in the current study were part of the Family and Health study in which Dutch families were surveyed over the course of five years since 2002 (for details on the sample selection see Harakeh et al. (2005), Van der Vorst et al. (2005) and Mares, Lichtwarck-Aschoff, et al. (2012)). Drinking motives were assessed during the fifth wave. Since drinking motives was the concept of main interest, and these can only be assessed among drinkers, we selected a sample in which young adults completed the drinking motives questionnaire and reported they consumed alcohol at least once in their life. This resulted in a subsample of 290 younger participants and 289 older participants (68%) and their parents out of the original 428 families. The sample mainly consisted of Caucasian participants (> 97 %). At T5, the younger participants in the final sample had a mean age of 18.3 years old ( $SD = .50$ ), and of these young adults, 47.6% was male. The older participants had a mean age of 20.2 years old ( $SD = .61$ ) and 51.2% was male.

### Measures

**Parental drinking motives.** The Drinking Motive Questionnaire (DMQ; Cooper et al., 1992), consisting of 15 items, was used to assess how often parents drink for social, coping, and enhancement reasons. Both fathers and mothers were asked to respond on a 5-point scale ranging from 1 '(virtually) never' to 5 '(nearly) always' to items such as 'I drink to forget my worries' (coping motives), 'I drink to get high' (enhancement motives) or 'I drink because it makes a party more fun' (social motives). Cronbach's alphas on all scales in mothers and fathers ranged from  $\alpha = .67$  to  $\alpha = .85$ .

**Young adult drinking motives.** For the young adults, the 20-item Drinking Motive Questionnaire Revised (DMQ-R; Cooper, 1994) was used. The drinking motives measured with this scale are equivalent to the DMQ, with the exception of the conformity motive, which was added in the adolescent version of the scale. This motive is measured with items such as 'I drink because my friends persuade me to drink'. Cronbach's alphas on all scales in both the younger and older group ranged from  $\alpha = .73$  to  $\alpha = .89$ .

**Young adult alcohol use.** A single item asked the young adults about their *frequency* of alcohol use during the past 4 weeks. They were asked to respond on a 6-point scale ranging from (1) "have not been drinking" to (6) "every day" (Engels & Knibbe, 2000). *Intensity* of drinking was assessed by asking the young adults about the number of drinks they had in the previous week during weekdays and in weekends, both at home and outside the home (Engels et al., 1999). The scores on these four intensity questions were summed to obtain an indication of the total number of glasses consumed per week.

**Alcohol-related problems.** The Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989), consisting of 18 items, was used to assess the number and intensity of alcohol-related problems in young adults. They were asked to specify how often they had

ever experienced alcohol-related problems in their life on a 5-point scale ranging from 1 'never' to 5 'very often' to items such as 'How often were you unable to make your homework because you drank alcohol?'. Cronbach's alpha was .84 for the younger group and .86 for the older group.

### Statistical Analyses

First, means, standard deviations, and bivariate correlations of model variables were calculated. Second, associations between maternal and paternal drinking motives, young adult drinking motives, and young adult alcohol use and alcohol-related problems were examined with MPLUS version 5.1 (Muthén & Muthén, 1998-2010; see Figure 1 for the conceptual models that were estimated in MPLUS). Parameters in the models were tested using maximum likelihood with the conventional standard errors and chi-square test statistics (ML). With missing data, the standard errors for the parameter estimates are computed using the observed information matrix. The latent factor of young adult alcohol use was measured by two indicators: frequency and intensity of drinking. Factor loadings were .68 and .79, indicating an adequate assessment of the latent factors by the manifest variables. All other model variables were manifest. Young adult sex and intensity of parental alcohol use were included as covariates in the model. Model fit was assessed by the following fit indices:  $\chi^2$ , CFI, and RMSEA (Hu & Bentler, 1999).

## Results

### Descriptive Statistics

On average, the young adults drank alcohol one or two times a week, with an average weekly consumption of approximately 10 glasses (see Table 1 for exact descriptive statistics). Both age groups reported few alcohol-related problems. Descriptive statistics (Table 1) showed that both the younger and older group reported highest social drinking motives, while conformity motives were lowest. Parents also reported that their social drinking motives were strongest, while their coping motives for drinking were lowest. Correlations between paternal and maternal drinking motives (Table 2) showed that there was low correspondence between endorsement of their motives. Except for a small positive association between paternal and maternal social drinking motives, drinking motives of mothers and fathers were not related to each other.

### Parent and Young Adult Drinking Motives

As can be seen in Figure 1, results showed that, for the younger group, their social and enhancement motives for drinking were positively associated with coping motives for drinking of their mother. When mothers reported higher coping motives, the younger group reported higher social and enhancement motives. Higher coping motives of the father were

**Table 1** Descriptive statistics for study variables

	Younger adolescent		Older adolescent	
	M	SD	M	SD
<b>Drinking motives adolescent</b>				
Social	2.50 <sup>a</sup>	.96	2.34 <sup>a</sup>	.90
Enhancement	2.14 <sup>b</sup>	.93	2.04 <sup>b</sup>	.84
Coping	1.54 <sup>c</sup>	.59	1.41 <sup>c</sup>	.52
Conformity	1.26 <sup>d</sup>	.44	1.19 <sup>d</sup>	.37
Alcohol use (F)	2.73	.97	2.95	1.07
Alcohol use (I)	11.07	17.71	9.79	12.47
Alcohol-related problems	1.26	.34	1.25	.34
	Mother		Father	
	M	SD	M	SD
<b>Drinking motives parent</b>				
Social	1.89 <sup>a</sup>	.72	2.16 <sup>b</sup>	.86
Enhancement	1.59 <sup>b</sup>	.57	1.76 <sup>c</sup>	.60
Coping	1.19 <sup>d</sup>	.42	1.20 <sup>d</sup>	.39

Note. F = Frequency, I = Intensity. Means in the same row (parents) or column (parents and young adults) that have different subscripts are significantly different ( $p < .05$ ).

associated with higher coping motives of the younger group. All remaining paths between parent coping motives and young adult coping motives were not significant. Males reported higher enhancement and conformity motives and higher intensity of paternal alcohol use was associated with higher conformity motives.

For the older group, higher coping motives of the mother were related to higher social motives to drink for the young adult. Higher father reports of enhancement motives for drinking were related to higher reports of all drinking motives for the older group. All other associations between parent drinking motives and young adult drinking motives were not significant. Males reported higher enhancement motives.

Figure 1 Conceptual model of parental factors in relation to adolescent factor.

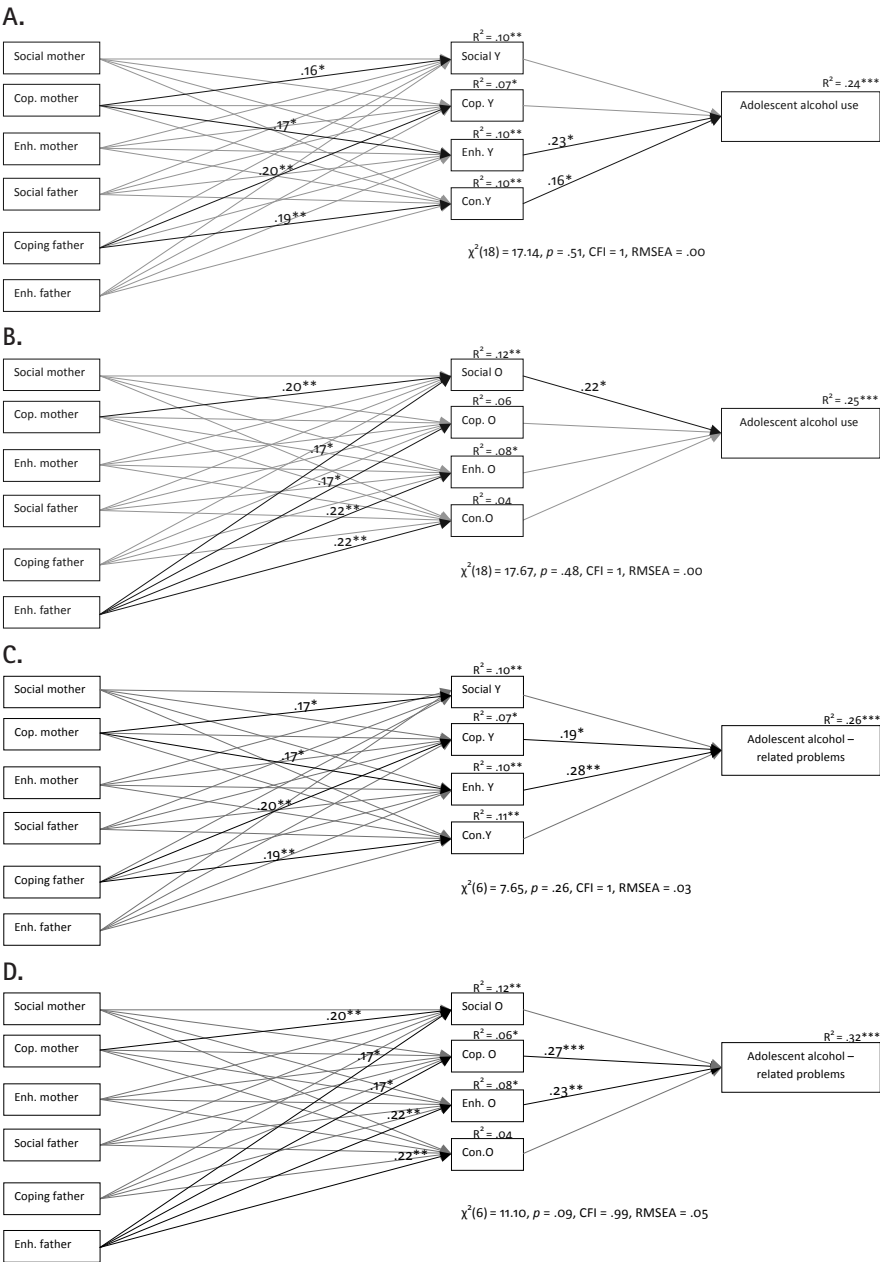


Table 2 Correlations between parental drinking motives

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Drinking motives mom										
1. Social		.67**	.38**	.18*	.13	.11	.10	.14*	.02	.03
2. Enhancement	.61**		.50**	.14	.13	.02	.14*	.16*	-.03	.02
3. Coping	.32**	.47**		.11	.09	.05	.20**	.21**	.06	-.04
Drinking motives dad										
4. Social	.14*	.12	.12		.61**	.24**	.17**	.08	.10	.02
5. Enhancement	.08	.10	.12	.63**		.31**	.15*	.04	.15*	.08
6. Coping	.11	.05	.06	.24**	.32**		.13*	.12	.20**	.10
Drinking motives adolescent										
7. Social	.10	.16*	.24**	.14*	.20**	.13*		.80**	.66**	.43**
8. Enhancement	.08	.10	.16*	.10	.20**	.10	.76**		.66**	.40**
9. Coping	-.02	.07	.11	.09	.17**	.09	.57**	.52**		.48**
10. Conformity	.03	.01	.07	.01	.13	.04	.40**	.36**	.43**	

Note. Younger adolescents are presented above the diagonal; older adolescents are presented below the diagonal.

### Young Adult Drinking Motives as Predictors for Alcohol Use and Alcohol-Related Problems

For the younger group, both enhancement and conformity motives for drinking were predictive of their alcohol use, in that higher enhancement and conformity motives were related to higher alcohol use a year later. For the older group, only higher social motives for drinking were predictive of higher alcohol use a year later. With regard to alcohol-related problems, in both the younger and older group higher coping and enhancement motives were associated with more problems.

### Discussion

In the current study, the associations between parental drinking motives and young adult drinking motives were examined. Also, it was expected that social drinking motives were related to young adult alcohol use, while coping and enhancement motives were related to alcohol-related problems. In line with our expectations, and with the literature in younger adolescents (Kuntsche, Wiers, Janssen, & Gmel, 2010; Adams, Kaiser, Lynam, Charnigo, & Milich, 2012), for both the older and younger group, alcohol-related problems were associated with coping and enhancement motives. Further, results showed that while the older group's social drinking motives were indeed related to their alcohol use, for the younger group, conformity and enhancement motives were positively associated with their alcohol use. This difference in findings for the older and younger group could be explained by an age effect. Previous studies with younger adolescent samples showed that enhancement (Cooper, 1994; Kuntsche et al., 2008; Kuntsche et al., 2010) motives were mainly related to normative alcohol use. For conformity motives, results were somewhat mixed (Kuntsche et al., 2008; Schelleman-Offermans, Kuntsche, & Knibbe, 2011). Older adolescent or young adult samples showed that it were mainly social motives that were related (Cooper et al., 1992; Müller & Kuntsche, 2011). Probably, these younger individuals still have to establish their drinking pattern. During this initiation period of drinking, when adolescents and young adults seek their own identity through exploration (Berk, 2005) and conforming to peer norms (Gavin & Furman, 1989; LaFontana & Cillessen, 2010), enhancement and conformity motives might be more important.

The present study provided some support for the cognitive model of intergenerational transference (Campbell & Oei, 2010) of drinking motives. The results showed that for younger individuals, stronger coping motives of the mother were related to stronger social and enhancement motives, while stronger coping motives of the father were associated with stronger coping motives of the young adult. For older individuals, stronger coping motives of the mother were related to stronger social drinking motives, and stronger enhancement motives of the father were associated with stronger overall drinking motives of the young adult. These results hint at a difference between mothers and fathers as to

which motives were most strongly associated with their children's drinking motives. For mothers, it were mostly coping motives that were significantly associated with several young adult drinking motives, whereas for fathers, enhancement motives were mostly predictive of different young adult motives. This finding could be due to the fact that, when compared to mothers, fathers reported stronger enhancement and social motives. When set off against social and enhancement motives, coping motives were relatively stronger for mothers than for fathers. Indeed, the literature also shows that social and enhancement motives are stronger for men compared to women (Kuntsche, Knibbe, Gmel, & Engels, 2006; Kuntsche et al., 2008). For young adults, these coping motives of mothers and enhancement motives of fathers are probably most apparent and therefore associated with their own overall drinking motives.

One could expect that one specific parental drinking motive would be associated with that same specific drinking motive of young adults (Windle & Windle, 2012). Yet, drinking motives within a person – both adults and adolescents – are highly correlated, indicating that when one particular drinking motive of a parent is stronger, there is a high probability that other drinking motives are stronger as well (Kuntsche et al., 2005). Perhaps it is difficult for young adults to differentiate between drinking motives within parents, when the differences in drinking motives between parents is more pronounced. The result could be that those parental drinking motives within a parent which are relatively strong compared to the other motives are associated with a general increase in young adults' drinking motives. This seems to be confirmed in the present study, especially with regard to the link between paternal and young adult drinking motives. Further, social and enhancement motives, which are more prevalent in fathers, were most strongly interrelated and could be seen as more general motives which can be interpreted in multiple ways. Therefore, it is not surprising that these motives of fathers are linked to more general young adult drinking motives. For mothers, coping motives are relatively more strongly endorsed compared to fathers. These coping motives are to a lesser extent related to the other motives and therefore more specific. Also, since they are negative as well as internal, these motives might be less visible for adolescents to notice. This would explain the fact that maternal motives are not as strongly and generally related to young adult drinking motives.

While this full exploration of parental and young adult drinking motives constitutes a significant contribution to the literature on the intergenerational transmission of drinking motives, some limitations should be mentioned. An important drawback of the current study is that drinking motives of parents as well as young adults were measured concurrently. Therefore, no inferences about causality can be made and the discussion of these results should be viewed with some caution. Further, although both parent and young adult reports were available, the sample size was relatively small considering the rather complex models that were tested. Therefore, it was not possible to consider several potentially important moderators. A first important moderator could be parental alcohol use, since previous research indicated that parental alcohol use is a predictor of adolescent drinking motives

(Müller & Kuntsche, 2011). Also, adult drinking motives and alcohol use have shown to be directly related (Cooper et al., 1992; Engels et al., 2005). While in our analyses, we did control for parental alcohol use, it would be interesting to see whether the associations between parental and young adult drinking motives depend on the amount of alcohol consumed by parents. A second moderator that could have been included is gender, since multiple studies showed gender effects on drinking motives (Cooper, 1994; Kuntsche et al., 2006), and also gender effects in the intergenerational transition of drinking motives have been found (Windle & Windle, 2012).

While results on the intergenerational transmission of several different alcohol-related cognitions have been mixed until now (Brody et al., 1998; Handley & Chassin, 2009; Parsai et al., 2009; Campbell & Oei, 2010; Windle & Windle, 2012), results of this study suggest that stronger drinking motives of parents are related to stronger drinking motives of children. Specifically, stronger coping and enhancement motives were associated with more alcohol-related problems, while for the younger and older group, respectively, stronger enhancement and conformity motives on the one hand, and social motives on the other, were related to more alcohol use. Future research should test this model in a larger sample which should be followed over time, to examine whether these parental cognitions are really predictive of young adult cognitions and alcohol use, and whether this association differs according to young adult gender or parental alcohol use patterns.

## Chapter 8

Parental alcohol-specific rules and alcohol use from early adolescence to young adulthood



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## Abstract

Several studies stress the importance of alcohol-specific rules during adolescence to prevent them from drinking early and heavily. However, most studies have short follow-up periods and do not cover the relevant developmental period in which direct parental control diminishes and adolescent alcohol use increases. The current study aimed to provide a developmental perspective on the link between alcohol-specific rules and alcohol use from early adolescence until early adulthood in the Netherlands. The sample consisted of 428 Dutch families including fathers, mothers and adolescents from two age groups (13 and 15 years old) at Time 1 (T1), who have been surveyed annually for six years. To address the effect of alcohol-specific rules on adolescent alcohol use over time, a latent growth curve analytic approach with time-varying covariates was employed. Over time, adolescent alcohol use increased, while alcohol-specific rules decreased. Most importantly however, the lagged paths of alcohol-specific rules consistently predicted subsequent alcohol use across the six assessments for both younger and older siblings. Thus, strict alcohol-specific rules at a certain point in time were related to a lower intensity of adolescent alcohol use a year later. Although parents turn somewhat less strict in alcohol-specific rules over time, and adolescent alcohol use increases over time, the specific rules parents set remain important in restraining the alcohol use of their adolescent offspring. Thus, parents should and can feel confident about their parenting capabilities, and they should maintain being strict to prevent their offspring from drinking.

## Introduction

Recently, the World Health Organization identified alcohol use among youth as a significant contributor to the global disease burden (World Health Organization, 2007). Indeed, adolescent alcohol use has been related to several negative short-term consequences such as aggression, delinquency, injuries, and unsafe sex (e.g., Cherpitel et al., 2005; Exum, 2006; Stueve & O'Donnell, 2005). Also, long-term consequences such as cognitive impairment, and psychiatric illnesses including depression, suicide, and alcohol addiction are associated with early adolescent alcohol use (e.g., DeBellis et al., 2000; Grant et al., 2006; Windle, 2004). Parents are important socializing agents when it comes to whether and how adolescents start or develop their alcohol use. Besides general parenting like control and support, alcohol-specific parenting has shown to be an important deterrent of adolescents' drinking behaviors (Van der Vorst et al., 2005).

The empirical literature on alcohol-specific parenting has grown extensively over the last decade, with alcohol-specific rules emerging as being effective in preventing or reducing adolescent alcohol use. Alcohol-specific rules should be distinguished from for example alcohol-specific attitudes or monitoring, which are more passive forms of alcohol-specific parenting. Alcohol-specific rules entail that parents actively impose rules on their children regarding their alcohol use inside and outside the house. Some cross-sectional studies suggest that alcohol-specific rules would be most effective in early adolescence to prevent both early onset and increase in alcohol use (Koning et al., 2010; Monshouwer et al., 2003). Other cross-sectional (Järvinen & Østergaard, 2009; Spijkerman et al., 2008; Van Zundert et al., 2006; Yu, 2003) as well as longitudinal (Martino et al., 2009; Van den Eijnden et al., 2011; Van der Vorst et al., 2009; Van der Zwaluw et al., 2010) research stresses the importance of rule-setting during adolescence to prevent or diminish alcohol use. These findings seem to be quite robust and alcohol-specific rules even seem to matter for at-risk adolescents such as genetically vulnerable adolescents (Van der Zwaluw et al., 2010), adolescents following special education (Van Zundert et al., 2006), and adolescents from low socioeconomic backgrounds (Spijkerman et al., 2008).

A gap in this field is the lack of knowledge about the developmental course of the influence of parental alcohol-specific rules on adolescent alcohol use from early adolescence to young adulthood. It is widely believed that parenting and rule-setting is most important in childhood while parental influence slowly decreases in adolescence as a result of the individuation process, in which children increasingly strive for autonomy and self-determination (Gnaulati & Heine, 2001; Steinberg, 1990). The main focus of adolescents is to develop a sense of self and more sophisticated ways of self-regulation (Arnett, 2008). During adolescence, friends become relevant socializing agents as well (Brown & Bakken, 2011). In line with this, research demonstrates the importance of peer drinking in adolescent alcohol use, particularly in social drinking contexts (Larsen, Engels, Sourén, Granic, & Overbeek, 2010; Poelen, Engels, Scholte, Boomsma, & Willemsen, 2009). Thus, while parents,

their adolescent children, and the peer culture are always interconnected at some level, adolescents increasingly spend time in contexts and activities where parents no longer play an active or direct role.

Based on this knowledge, a possible scenario about the developmental changes in the impact of parental alcohol-specific rules on adolescent alcohol use is that parents lose direct influence over their children, and over time, alcohol-specific rules will no longer be predictive of adolescent alcohol use. While this scenario is often mentioned (e.g., Patock-Peckham, Cheong, Balhorn, & Nagoshi, 2001), there is little empirical support for this conclusion. Another possible scenario entails that strict alcohol-specific rules would lead to the internalization of these rules and the accompanying values. In this case, rules and values in the parental home could be transported to other contexts, even when children do not live together with their parents anymore. Recently a few cross-sectional studies indeed suggested that parental rule-setting is still predictive of adolescent alcohol use when children enter college and move out of their parents' residence (Abar, Abar, & Turrisi, 2009; Turrisi & Ray, 2010; Wood et al., 2004). Also, drinking of alcohol at family home predicted later alcohol use in outside home settings (Van der Vorst, Engels et al., 2010), supporting the internalization of rules scenario. However, findings are somewhat mixed, since a review of longitudinal studies could not yet support the sustained effectiveness of alcohol-specific rules (Ryan et al., 2010).

In order to test these competing scenarios – parental alcohol-specific rules remaining predictive versus parental alcohol-specific rules losing predictive power – against each other a sample covering the full developmental period in which direct parental control diminishes and adolescent alcohol use increases is necessary. Only by capturing the entire period from early adolescence to young adulthood reveals how and to what extent parental alcohol-specific rules affect adolescent alcohol use over time. In addition, studies that were conducted during the college years all originate from the United States of America, in which alcohol use is prohibited until the age of 21. During the time of study, the participants were thus legally not allowed to drink alcohol, which might indicate that setting of alcohol-specific rules is more valid for these parents. In Dutch society – as in many Western countries – it is legal for adolescents to drink alcohol from the age of 16. Perhaps, Dutch parents do not feel supported by societal culture in setting rules for older adolescents and at the same time Dutch adolescents might be less likely to accept these rules due to a lack of societal pressure to do so. It would be valuable to look at the development of parental alcohol-specific rules as well as adolescent alcohol use over time in a society in which alcohol use is legally allowed at such a young age.

The current study aimed to provide a developmental perspective on the link between alcohol-specific rules and alcohol use from early adolescence until early adulthood in the Netherlands. The following hypotheses were tested: I) intensity of adolescent alcohol use will increase over the course of time II) strictness of alcohol-specific rules will decrease over the course of time, and III) alcohol-specific rules will continue to be negatively related to

adolescent alcohol use, even into early adulthood. While testing these hypotheses, possible confounders such as gender, living situation of the adolescent (at home or by themselves), parental alcohol use, and social economic status were taken into account.

## Method

### Procedure

The current study used data that are part of a prospective longitudinal study called "Family and Health" (Van der Vorst et al., 2009; Van der Zwaluw et al., 2010). The Central Committee on Research Involving Human Subjects in The Netherlands approved the survey procedures. Addresses of Dutch families – including at least two children aged 13-16 years – were obtained from the records of 22 Dutch municipalities. Of the 5,400 families that were mailed to ask for their participation in the survey, 885 agreed to take part and gave their informed consent by signing and sending back the application form. This group was narrowed down to 765 families who fulfilled the criteria of (I) parents living together or being married, (II) parents and adolescents being biologically related, (III) siblings not being a twin, (IV) none of the children being physically or mentally disabled, and (V) parents and adolescents being able to read or write in Dutch. To reach an equal division of adolescents' education level and sibling dyads (i.e. boy-boy, boy-girl, girl-girl, girl-boy), a selection was made. The result was a final sample of 428 families at baseline measurement (T1) in November 2002, including both parents and two adolescent children. Six annual waves of data collection have been finished. From T2-T6, respectively 416, 404, 356, 326, and 323 families participated, resulting in a response rate of 75% across waves.

At baseline, families were visited at home. At subsequent waves, part of the families received the questionnaires by mail, while at T6, all families received shortened versions of the questionnaires by email. All family members were asked to individually fill out a questionnaire and they were told not to discuss the questions with each other. After all four family members completed the questionnaire each family received 30 Euros per wave. After the third wave, 5 travel checks worth €1000 were raffled among the participating families. For participation in the last three waves, 5 iPods and again 5 travel checks were raffled. These incentives were used to improve response rates (Edwards et al., 2002).

### Participants

The majority of the families were of Dutch origin (95%). Younger and older adolescents had a mean age of 13.36 years ( $SD = .50$ ) and 15.22 years ( $SD = .60$ ) at baseline. Attrition analysis showed that families who completed six measurements ( $n = 323$ ) differed from the drop-outs ( $n = 105$ ) in educational level of the younger adolescents (odds ratio [OR] = 1.53,  $p = .02$ , 95% confidence interval [CI]: 1.06-2.22). Younger adolescents of families that dropped out were more likely to follow higher education. The Cox and Snell indicator of explained variance was .05, indicating that the model variables predicted limited variance in attrition.

## Measures

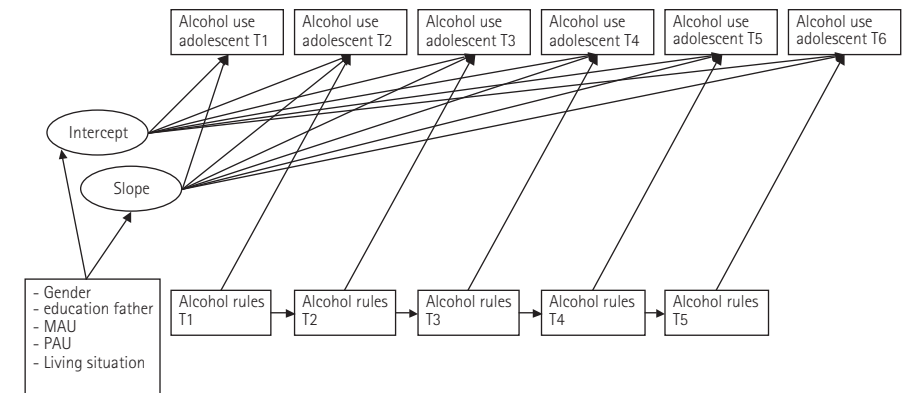
**Alcohol-specific rules.** To assess adolescents' view on parental alcohol-specific rules, a 10 item scale of Van der Vorst et al. (2005), which showed good content validity and reliability, was used at T1-T5. Adolescent reports were used, since the way they experience parenting is a better predictor of their behavior compared to parent views on parenting (Chassin et al., 2005). Response categories on the items shown in the appendix ranged from 1 = *completely applicable* to 5 = *not applicable at all*. A higher mean score on this scale reflected more strict alcohol-specific rules. Internal consistencies were high over the waves, ranging from  $\alpha = .88-.92$ .

**Adolescent and parental alcohol use.** At T1-T6, intensity of adolescent and parental drinking was assessed by asking them about the number of alcoholic beverages they drank in the previous week. The four items tapped alcohol use during weekdays and in the weekend, both at home and outside the home (Engels et al., 1999). Sum scores were used as an indication of the total quantity of weekly alcohol use.

## Strategy of Analyses

Means and standard deviations were computed for alcohol-specific rules, and adolescent and parental alcohol use. To determine the development of alcohol-specific rules and adolescent alcohol use over time, basic latent growth curves were employed using Mplus (Muthén & Muthén, 1998-2010). Parameters in the models were estimated using the maximum likelihood estimator with robust standard errors (MLR). The initial value (intercept) of alcohol-specific rules and adolescent alcohol use and the rate of change from baseline over time (slope) were computed. We tested models that included linear and quadratic slopes, but elected to present the models that best fit the observed data, which allowed parameters estimating growth in the last three time points of alcohol use to be freely estimated. Next, the intercept and slope of adolescent alcohol use were regressed on alcohol-specific rules at baseline. To investigate the effect of alcohol-specific rules on adolescent alcohol use over time, a latent growth curve analysis with time-varying covariates was employed (similar to model 6.10 in the Mplus manual, p 95-96; Muthén & Muthén, 1998-2010). The intercept and the slope of adolescent alcohol use were regressed on demographic variables (gender, paternal education with middle and high level of education as dummy variables and low level of education as reference) and on the alcohol use of both parents. Alcohol-specific rules was used as a cross-lagged time-varying predictor of growth in adolescent alcohol use, to facilitate inferences about cause (Li, Duncan, McAulry, Harmer, & Smolkowski, 2000). Finally, intercept and slope were also regressed on the living situation of the adolescent at T6 (with parents or by themselves). See Figure 1 for an overview of the model that was tested. Chi-square values (df), the Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA) were used to assess model fit. All models were tested for younger and older adolescents separately.

**Figure 1** Latent growth curve model with alcohol-specific rules as time-varying covariates.



## Results

### Descriptive Statistics

Descriptive statistics (Table 1) showed that while adolescents grow older, their intensity of alcohol use initially increased and stabilized after T4. Of the younger adolescents, the majority (83.2%) still lived at home by the time of the last measurement. Of the older adolescents, approximately half of them had moved out of the parental house by the time of the last measurement. Fathers reported a higher intensity of alcohol use compared to mothers.

### Development of Alcohol-Specific Rules and Adolescent Alcohol Use

Basic growth models for younger adolescents showed that parents, on average, set high alcohol-specific rules at baseline (mean intercept: 4.04,  $p < .001$ ), after which they decreased in strictness (mean slope:  $-.47$ ,  $p < .001$ ). With regard to younger adolescent alcohol use, intercept (mean intercept: 1.15,  $p < .001$ ) and slope (mean slope: 2.14,  $p < .001$ ) were significant as well, indicating an intensity of adolescent weekly drinking at baseline above 0 and an increase of adolescent drinking over time. Results for the older adolescents were comparable, with a significant intercept (mean intercept: 3.21,  $p < .001$ ) and slope (mean slope:  $-.41$ ,  $p < .001$ ) for alcohol-specific rules and a significant intercept (mean intercept: 4.38,  $p < .001$ ) and slope (mean slope: 2.86,  $p < .001$ ) for adolescent alcohol use.

Next, we assessed the effect of baseline alcohol-specific rules on the intercept and slope of younger adolescent alcohol use ( $\chi^2(50) = 128.49$ ,  $p < .001$ ; CFI = .93; RMSEA = .06). This model showed that alcohol-specific rules at baseline had a negative effect on the baseline

**Table 1** Descriptive statistics for study variables

	Younger adolescents		Older adolescents	
	M	SD	M	SD
AAU T1	1.15	2.97	4.37	6.81
AAU T2	3.04	6.93	7.22	9.88
AAU T3	5.59	9.90	9.21	12.14
AAU T4	10.81	14.28	13.17	15.19
AAU T5	10.84	14.35	11.29	12.67
AAU T6	10.68	13.36	11.37	12.46
Rules T1	4.05	.80	3.26	.94
Rules T2	3.55	.86	2.72	.87
Rules T3	3.12	.90	2.45	.82
Rules T4	2.53	.81	2.03	.80
Rules T5	2.35	.81	1.99	.79
Living at home <i>n</i> (%)	248	(83.2)	137	(55.5)
MAU T1	6.23	7.24		
PAU T1	13.47	12.86		

Note. AAU = Adolescent Alcohol Use, MAU = Maternal Alcohol Use, PAU = Paternal Alcohol Use.

level ( $\beta = -.41, p < .001$ ) and development of adolescent alcohol use ( $\beta = -.25, p < .01$ ), indicating that strict alcohol-specific rules in early adolescence resulted in a lower initial level and increase in intensity of adolescent alcohol use over time. The same model for the older adolescent ( $\chi^2(50) = 128.97, p < .001$ ; CFI = .92; RMSEA = .06) showed that strict alcohol-specific rules at baseline were related to lower initial level ( $\beta = -.37, p < .001$ ) and increase of alcohol use over time ( $\beta = -.19, p < .01$ ).

**Alcohol-Specific Rules and Adolescent Alcohol Use over Time for Younger Adolescents**

Next, we examined the effect of alcohol-specific rules on adolescent alcohol use over time while controlling for gender, paternal educational level, parental alcohol use, and living situation at T6. This model showed a good fit ( $\chi^2(92) = 200.71, p = .00$ ; CFI = .92; RMSEA = .05; Table 2). Of the control variables, middle and higher education of the father was related to lower initial levels of adolescent alcohol use, compared to low education of the father.

**Table 2** Associations between alcohol-specific rules and adolescent alcohol use over time

		Younger Adolescents		Older Adolescents	
		$\beta$	SE	$\beta$	SE
<b>Paths to intercept</b>					
Gender	– intercept	-.06	.05	-.22***	.07
Middle parent edu	– intercept	-.13***	.04	-.15*	.07
High parent edu	– intercept	-.13**	.05	-.17**	.06
MAU T1	– intercept	.06	.07	.10	.08
PAU T1	– intercept	.15*	.07	.20**	.07
Living situation	– intercept	.00	.07	-.02	.11
<b>Paths to slope</b>					
Gender	– slope	-.39***	.05	-.55***	.06
Middle parent edu	– slope	-.01	.06	-.13	.07
High parent edu	– slope	-.03	.06	-.09	.06
MAU T1	– slope	.10	.06	.21**	.07
PAU T1	– slope	.18**	.06	-.11	.07
Living situation	– slope	-.04	.04	.20**	.07
<b>Time-varying covariates</b>					
Rules T1	AAU T2	-.06***	.02	-.06***	.02
Rules T2	AAU T3	-.08*	.03	-.11***	.02
Rules T3	AAU T4	-.12***	.04	-.09**	.03
Rules T4	AAU T5	-.12**	.04	-.11***	.03
Rules T5	AAU T6	-.09*	.05	-.06*	.03

Note. MAU = Maternal Alcohol Use, PAU = Paternal Alcohol Use, AAU = Adolescent Alcohol Use \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .00$

Higher intensity of paternal alcohol use was related to higher initial levels of and stronger increases in adolescent alcohol use. Boys had a stronger increase in intensity of alcohol use compared to girls. Maternal drinking and living situation were not significantly related to the intercept and the slope of adolescent alcohol use. With regard to the effect of alcohol-specific rules on adolescent alcohol use over time, the lagged paths remained significant for all points in time (time-varying covariates). Thus, strict alcohol-specific rules resulted in lower levels of adolescent alcohol use a year later, for every point in time.

### Alcohol-Specific Rules and Adolescent Alcohol Use over Time for Older Adolescents

An identical model for older adolescents showed a good fit ( $\chi^2(92) = 206.73, p = .00$ ; CFI = .92; RMSEA = .05; Table 2). Of the control variables, education and paternal alcohol use were respectively negatively and positively related to the intercept of alcohol use, which means that middle and higher vs. lower education of the father and lower intensity of paternal alcohol use were related to lower initial levels of adolescent alcohol use. Higher intensity of maternal alcohol use was related to stronger increases in adolescent alcohol use. Boys had a higher initial level of and increase in intensity of alcohol use compared to girls. The living situation of the adolescent was also significantly related to the slope, indicating that adolescents who lived away from parents showed a stronger increase in intensity of alcohol use compared to adolescents who lived with their parents. The lagged paths of alcohol-specific rules at T1-T5 to alcohol use at T2-T6 were significant for all time points.

### Discussion

The aim of the present study was to provide a developmental perspective on the association between parental alcohol-specific rules and adolescent alcohol use. Results showed that, although parents become somewhat less strict in alcohol- rules over time, and adolescent alcohol use increases over time, alcohol-specific rules parents set remain important in restraining the alcohol use of their adolescent children. Strict alcohol-specific rules were related to less alcohol use from early adolescence until early adulthood, even though part of the adolescents lived by themselves during early adulthood. These findings are in accordance with research conducted in the United States showing the significance of alcohol-specific rules during late adolescence and early college years (Abar et al., 2009; Turrisi & Ray, 2010; Walls, Fairlie, & Wood, 2009; Wood et al., 2004). In contrast to the North-American or for example the Scandinavian context, buying soft-alcoholic beverages is legal in the Netherlands after the age of sixteen, which accounts for several other European countries. Our results show that even in this context, parents do exert some control on their adolescents' alcohol use. The present findings support the scenario that parental alcohol-specific rules are predictive of adolescents drinking during late adolescence and early adulthood. This indicates that strict alcohol-specific rules can still exert a protective effect on adolescent alcohol use, even when these adolescents grow older. Therefore, it is useful to support parents in their efforts to keep setting clear alcohol-specific rules.

Besides the association between alcohol-specific rules and adolescent alcohol use, the results entailed information on the association between alcohol use and educational level of parents and gender and living situation of the adolescent on the development of

adolescent alcohol use over time. First, findings showed that alcohol use of mainly the father is associated with baseline of and increase in juvenile drinking over time. Indeed, other studies indicated as well that paternal alcohol use is related to adolescent excessive alcohol use and abuse (Mares, Van der Vorst, Engels et al., 2011; Seljamo et al., 2006). Second, adolescents with lower educated fathers had higher initial levels of alcohol use. Low educational level of the father can be seen as an indication of low social economic status. Other research has also found a relationship between low social economic status and higher initial levels of alcohol use (e.g., Spijkerman et al., 2008). Further, the intensity of adolescent alcohol use at baseline and the increase over time proved to be higher for boys compared to girls. Previous research showed similar findings on gender differences (e.g., Hibell et al., 2009; Monshouwer et al., 2008; Poelen et al., 2005; Spijkerman et al., 2008). Finally, adolescents living by themselves showed a steeper increase in alcohol use. Adolescents living on their own have more freedom to create opportunities to drink and have no liability towards parents. Many studies have already shown college students to drink excessively (Hingson, Zha, & Weitzman, 2009). However, an important contribution of the present study is the finding that even when adolescents grow older and have more freedom, alcohol-specific rules can still make a difference in the amount of alcohol young people consume.

Despite strengths such as the longitudinal design, some limitations of this study have to be mentioned. First, adolescents were followed from 13-20 years of age, while after the increase of alcohol use in late adolescence, intensity of alcohol use is known to decrease again after the early twenties (Caetano & Babor, 2006). Moreover, during this later age period, even more children move out of the parental home. It would be interesting to follow these adolescents over an extended period of time to capture the extent to which the effect of alcohol-specific rules on young adults' alcohol use remains. Second, since the aim of this study was to present a clear picture of the development of the direct link between alcohol-specific rules and adolescent alcohol use, we did not examine a host of potential moderators, such as child characteristics, gender of adolescents and parents, or peer alcohol use. Inclusion of these factors could further enhance the robustness of these findings and these might be interesting avenues for future research. Third, the sample recruited in the present study merely consisted of intact families. Future research should also focus on the effect of alcohol-specific rules in for example single-parent families as children in these families separate from their parents and tend to leave home at a younger age (Aquilino, 1991). This might be an indication that these children are less susceptible to parental influences like alcohol-specific rules, especially once they leave home. Given the strengths and limitations discussed above, some important implications for practice can be derived from these results.

The results discussed above clearly stress the importance of parental rule-setting from early adolescence until early adulthood. Therefore, prevention and intervention programs focused on strengthening the abilities of parents to guide alcohol use of their children and

adolescents can account for considerable improvement in adolescent health (Koning et al., 2009; Mares, Van der Vorst, et al., 2012). Programs like these have shown to be promising and could be implemented on a larger scale. These prevention programs mainly focus on parenting during early adolescence. Later in adolescence, when youngsters are prone to increase the amounts of alcohol they consume, practitioners should be aware of the possible contribution parents can have in guiding their adolescents' behavior. Moreover, the contribution of parents is often thought to be mainly limited to maternal influence. Yet, results show that especially when it comes to modeling of alcohol use, the role of fathers is at least as important, perhaps even more, compared to that of mothers (Mares, Van der Vorst, Engels, et al., 2011). Thus, both parents should be involved when it comes to their children, even when their children have reached early adulthood.

To summarize, a developmental view on alcohol-specific rules and adolescent alcohol use from early adolescence to early adulthood (13-20 years) was provided. While alcohol-specific rules decreased over time and adolescent alcohol use increased over time, strict alcohol-specific rules remained related to lower levels of adolescent alcohol use over the course of time. Parents often feel like they are losing control of their adolescent children. While this may be true to some degree, this study provides evidence for the sustained effect of parental rules on adolescent alcohol use.

## Appendix

Survey items of the alcohol-specific rules scale

1. I am allowed to drink a glass of alcohol at home when my mother or father is home
2. I am allowed to drink a glass of alcohol at home when my mother and father are absent
3. I am allowed to drink several glasses of alcohol at home when my mother or father is home
4. I am allowed to drink several glasses of alcohol at home when my mother and father are absent
5. I am allowed to drink as much alcohol as I want outside the home
6. I am allowed to drink alcohol at a party with my friends
7. I am allowed to come home intoxicated
8. I am allowed to get intoxicated during going out with friends
9. I am allowed to drink alcohol during the weekend
10. I am allowed to drink alcohol during the week



## Part 2

In control: No alcohol!  
Effectiveness of an alcohol  
prevention program



# Chapter 9

Results of the "In control!  
No alcohol" pilot study



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## Abstract

More than 50% of Dutch 12-year olds already started drinking. Since it is known that delaying the onset of alcohol use results in a lower risk of alcohol-related problems, the recently developed "In control! No alcohol" prevention program is targeted at elementary school children and their mothers. In this pilot study the success of program implementation and impact of the program on quality of alcohol-specific communication, rules, and monitoring were evaluated, using a randomized controlled design. A total of 108 children (11-12 years) and their mothers participated in the prevention program, while the control group consisted of 105 dyads. Families participating in the experimental condition showed an increase in frequency of alcohol-specific communication and 75% of the dyads reported they took part in at least 3 of 5 magazines, suggesting implementation was successful. The program led to an increase in quality of communication, but only for those dyads in which mothers' alcohol use was above average. The program led parents to set up a non-drinking contract with their children and to monitor their children more closely. Results are promising, but need to be replicated in a larger, longitudinal study.

## Introduction

Alcohol use has been attributed to significant health, social, and economic problems worldwide, with adolescents being more vulnerable to the negative effects of alcohol use (World Health Organization, 2007). The Netherlands is among the European countries with the highest percentage of alcohol-using adolescents and in which adolescents drink the highest amounts of alcohol (Hibell et al., 2009). At the age of 12, more than 50% of the Dutch adolescents have had their first drink and 16% even stated to have their first drink before the age of 12 (Monshouwer et al., 2008). Prevention of alcohol use among elementary school children is important, particularly because delaying the consumption of the first glass of alcohol results in a lower risk of several alcohol-related problems, such as alcohol abuse or dependence, in adulthood (Behrendt et al., 2009; Englund et al., 2008). However, most alcohol prevention in the Netherlands takes place during secondary school years<sup>1</sup> (e.g. Koning et al., 2009). Since Dutch adolescents start drinking before the age of 12, the recently developed "In control! No alcohol" prevention program is targeted at elementary school children (11-12 years old) and their mothers and is mainly based on socialization and communication theories (Bandura, 1986; Petty & Cacioppo, 1986). In the present pilot study, the effect of the program on anti-alcohol socialization of parents was evaluated using a randomized controlled design.

Both socialization theory and research have indicated that parents are the main socializing agents in their children's development, especially when it comes to health issues (Lau, Quadrel, & Hartman, 1990; Tinsley, 1992). Parent-child communication is a powerful tool in the socialization of young adolescents (Kunkel, Hummert, & Dennis, 2006). Communication is important in negotiating rules and at the same time supporting the adolescent to independently make important decisions, for example, whether or not to drink alcohol (Noller, 1995). Several studies showed that openness and supportiveness in parent-child communication is associated with lower rates of alcohol use in adolescents (Ackard, Neumark-Sztainer, Story, & Perry, 2006; Booth-Butterfield & Sidelinger, 1998; Cable & Sacker, 2008; Kafka & London, 1991). Clearly, the general ability of parents to engage in high-quality communication with their adolescent children can prevent children from drinking alcohol early and frequently.

Surprisingly, the findings concerning alcohol-specific parent-child communication are not as unambiguous. While some studies show that frequent alcohol-specific communication reduces the risk of alcohol use in adolescents (Martyn et al., 2009; Pasch, Stigler, Perry, & Komro, 2010), others do not find an association (Ennett, Bauman, Foshee, et al., 2001) or even suggest that frequent alcohol-specific communication might lead to an increase in adolescent alcohol use (Van der Vorst, Burk et al., 2010). These mixed findings may be

<sup>1</sup> In Dutch education, children transfer from primary to secondary school at the age of 12.

explained by the fact that those studies did not take into account quality of alcohol-specific communication. Probably, quality of communication about alcohol matters when assessing effectiveness in preventing adolescents from drinking alcohol. Indeed, several studies showed that instead of frequent alcohol-specific communication, a few solid conversations about alcohol are more effective in keeping adolescents away from alcohol (Miller-Day & Kam, 2010; Spijkerman et al., 2008; Van den Eijnden et al., 2011). Therefore, overall communication skills were addressed throughout the program to support the quality of the conversations.

Besides communication, the two other socialization practices that are the main focus of the program were alcohol-specific rules, which also included the presence of a non-drinking contract, and monitoring. Alcohol-specific rule-setting has consistently been shown to be an effective parenting strategy to prevent children from starting to drink alcohol (Koning et al., 2010; Monshouwer et al., 2003; Van der Vorst et al., 2007), but also to prevent adolescents from drinking excessively once they have started to drink (Järvinen & Østergaard, 2009; Martino et al., 2009; Spijkerman et al., 2008; Van der Zwaluw et al., 2010; Van Zundert et al., 2006; Yu, 2003). The same accounts for general parental monitoring, which has been indicated as an important parental strategy to prevent and regulate adolescent drinking (Barnes et al., 2000; Duncan, Duncan, et al., 2006; Miller & Plant, 2003). Since the program explicitly tells parents that alcohol-specific rules and monitoring can be effective strategies and how they can employ these strategies, we expect parents participating in the program to have stricter rules and to monitor their children more closely compared to parents that do not participate in the program.

Anti-alcohol socialization might be especially important for families in which parents drink (heavily), because children in these families are at an increased risk for early and heavy alcohol use (e.g. Kumpfer, Alvarado, & Whiteside, 2003; Latendresse et al., 2008; Tildesley & Andrews, 2008; Van der Vorst et al., 2005; Koutakis et al., 2008; Van Zundert et al., 2006). However, drinking parents tend to engage less in alcohol-specific socialization practices (Latendresse et al., 2008; Van der Vorst et al., 2005), probably because they do not consider themselves being credible in prohibiting their children from drinking. Therefore, it is important to empower this specific group of parents to enhance the confidence alcohol-drinking parents have in the effectiveness of their alcohol-specific parenting strategies. The current program addresses this issue by increasing mothers' comfort level in communicating with their children about (their own) alcohol use. Although several family-based alcohol prevention programs have been shown effective (Koning et al., 2009; Koutakis et al., 2008; Kumpfer et al., 2003; Smit et al., 2008), the "In control! No alcohol!" program is the first one to target parent-child interactions regarding alcohol at such an early age.

The present study evaluated the program using a pilot randomized controlled trial with an intervention and a control condition. To assess whether implementation of the program was successful, short-term, direct effects of the intervention on frequency of communication

about alcohol were tested. We expected that mothers in the intervention condition would communicate about alcohol with their children more frequently compared to the mothers in the control condition. Second, with regard to effectiveness of the program, we expected that mothers in the intervention condition would engage in more high-quality conversations about alcohol use with their children, set stricter alcohol-specific rules, make a non-drinking contract, and monitor their children more compared to mothers in the control condition. Third, we tested whether the effects on all of the measures mentioned above would differ between drinking and non-drinking mothers.

## Method

### Procedure

In May 2009, 60 schools were selected randomly, stratified by urbanization level, from a list of primary schools in the region South-Holland of the Netherlands and asked to distribute recruitment materials. A total of 33 schools distributed the materials to a total of 892 fifth graders and their mothers. Recruitment materials consisted of an information letter about the program and research project and an application form including signed consent, which was sent back by 218 mothers. These mothers and their children were randomly assigned to either the intervention or the control condition with the schools as units of randomization. To end up with two equally large groups, we stratified by amount of parents and children participating per class (small, medium, large). An information letter concerning the program ("In control! No alcohol" or a general brochure about alcohol) was sent to the parents in October 2009. At the start of the intervention program 105 families in the control condition and 108 families in the intervention condition still agreed to participate.

Both mothers and their children were involved in this study. Data were collected by means of an online questionnaire for mothers and children which were sent to them separately by e-mail and which they filled in at home. The first questionnaire was sent in November 2009 before any intervention was carried out, and the second in April 2010 after the intervention was completed. The second questionnaire also consisted of participation records and an evaluation of the intervention. During the intervention, five magazines were mailed to the homes of families in the experimental condition with an interval of four weeks, starting in December 2009. Participating families in the control condition received a brochure about alcohol and parenting once in January 2010.

### The Intervention

This recently developed alcohol-prevention program is based on the principles of a smoking prevention program called "Smoke-free Kids" (Jackson & Dickinson, 2003). The focus of this program is on enabling parents to prevent their children from smoking. It has

shown to be effective in a sample of U.S. families (Jackson & Dickinson, 2006) and is currently being tested in a sample of Dutch families (Hiemstra et al., 2009). The main methods of child socialization addressed are communication, rule setting, and monitoring. The program structure is derived from Social Cognitive Theory (Bandura, 1986) to identify the critical elements of child socialization, such as cognitive rehearsal and motivation. Further, models of persuasive communication for attitude and behavioral change (Petty & Cacioppo, 1986) are used to improve the persuasiveness of the program. While designing the alcohol-prevention program, adjustments have been made, based on recent evidence on alcohol-specific socialization.

The intervention consisted of five magazines that each had the same composition. The first page always contained the instruction on how to read the magazine. Also, it provided a short introduction to the topic of the current magazine and a short reflection on the previous magazine. The second page was meant for the parents to read, with information on the topics of that specific magazine. The next four pages contained different games and assignments for parents and children to complete together. A few examples of games and assignments are a puzzle, an interview that the child had to do with the parent, or a game of the goose with questions about alcohol. The last page of the magazine consisted of some concluding pointers and a code with which they could enter the intervention website to gain more information or play some more games. Most parents and children spent somewhere between 15 to 30 minutes on each magazine.

Each of the five magazines sent home monthly to the mothers and children addressed different important issues regarding youth alcohol use and child socialization. Magazine 1 consists of general information about alcohol, alcohol use among children and the importance of parenting behavior, such as anti-alcohol norms and parental supervision. Magazine 2 addresses the risks of alcohol use, especially among children, and parental attitudes towards early drinking. Magazine 3 focuses on parental modeling of alcohol use and the effectiveness of setting rules about alcohol, also for parents who use alcohol themselves. Magazine 4 is aimed at enhancing awareness about peer influence and increasing the ability to handle peer pressure, while magazine 5 discusses the influence of alcohol-related media and again stressed the importance of setting clear and strict rules. In addition to these specific topics, each magazine contains general information and practical tips on high-quality parent-child communication in order to gradually increase parents' skill and comfort level in communicating with their children about alcohol.

## Participants

The majority of participating mothers and children was of Dutch origin (> 95%). Gender of the children was almost equally divided, with 50.7% being girls. Children's age ranged from 10 to 13 years ( $M = 11.26$ ,  $SD = .52$ ). The age of the mothers ranged from 32 to 56 years ( $M = 41.57$ ,  $SD = 4.36$ ). Almost half of the mothers only finished elementary school or a low educational level of Dutch secondary school (49.5%) and 45.4% of the

mothers finished vocational education or college. The remaining 5.1% finished university. A logistic regression analysis was conducted to check whether mothers and children who completed both measurement waves differed compared to mothers and children that dropped out. Results showed that mothers and children who completed both measurement waves ( $n = 190$ ) did not differ from drop-outs ( $n = 28$ ) in child's gender, and age, educational level, and alcohol use of the mother. While mothers did not differ in their reports on frequency of communication about alcohol, children in the families that dropped out reported somewhat less frequent communication about alcohol on the baseline measurement (odds ratio = .38,  $p < .01$ , 95% confidence interval: .20, .73). Finally, mothers and children in the families that dropped out did not differ in the reports on quality of communication about alcohol between mother and child, alcohol-specific rules, the existence of a non-drinking contract, and monitoring from families that completed both measurement waves.

## Measures

**Maternal alcohol consumption.** At the first measurement wave, mothers were asked about the number of alcoholic beverages they drank in the previous week with four items, targeted on weekdays and weekend, both home and outside the home (Engels et al., 1999). These four items were summed, representing the total number of alcoholic drinks consumed in a week.

**Maternal alcohol-related problems.** The degree of problems experienced by the mother due to alcohol consumption was measured at wave 1 with a short version of the severity of problem drinking scale (Cornel et al., 1994). A previous study with a large group of adults showed the short scale to be a valid alternative to the total scale (Bot, Engels, & Knibbe, 2005). Response categories on the six items ranged from 1 = *never* to 5 = *always*, of which mean scores were computed, with a higher score reflecting more problems due to drinking alcohol. Some examples of items are: "Have you ever tried to quit drinking without being successful?" and "Did your partner or close relatives ever worry about your alcohol consumption, or complain about it?" The alpha was .69.

**Frequency of alcohol-specific communication.** A Dutch translation of the alcohol-specific communication scale of Ennett, Bauman, Foshee, et al. (2001) was used to assess eight specific domains of parent-child communication on alcohol (Van der Vorst et al., 2005): 1) negative consequences of use, 2) peer pressure resistance, 3) encouragement to choose non-drinking friends, 4) media portrayal of alcohol, 5) encouragement not to use, 6) telling the adolescent not to use, 7) rules about use and 8) discipline. Children reported how many times they talked about these topics with their mothers in the last twelve months on a 5-point Likert scale ranging from 1 = *never* to 5 = *very often*. Reliabilities were computed, resulting in an alpha of .90 at both waves.

**Quality of alcohol-specific communication.** Children were asked about the quality of maternal communication about alcohol with six items, such as "My mother and I are



interested in each other's opinion about alcohol", "My mother and I talk easily about our opinions regarding drinking", and "If we are talking about alcohol use, my mother takes me seriously" (Spijkerman et al., 2008) Response categories ranged from 1 = *completely untrue* to 5 = *completely true*, of which mean scores were computed. A high mean on this score reflected a high quality of parental communication about alcohol. Alphas were .71 for the first wave and .73 for the second wave.

**Alcohol-specific rules.** A 10-item scale (Van der Vorst et al., 2005) was adjusted for elementary school children (resulting in 11 items) and used to assess children's view on parental alcohol-specific rule-setting. An example item is 'are you allowed to drink a nip of alcohol in the absence of your parents?', with response categories ranging from 1 = *definitely not* to 5 = *definitely*. A lower mean on this scale reflected more strict alcohol-specific rules. Alphas were .74 for the first wave and .83 for the second wave.

**Non-drinking contract.** A single question was used to ask children whether they and their parents made a non-drinking contract stating until what age the child was not allowed to drink.

**Monitoring.** Three items were used to ask children whether their parents solicited information on the child's whereabouts and whether the child needed parental permission to go out (Kerr & Stattin, 2000). Response categories ranged from 1 = *never* to 5 = *always* with higher mean scores reflecting more parental monitoring. Alphas were .65 for the first wave and .75 for the second wave.

### Strategy of Analysis

First, means and standard deviations of background and model variables were computed per condition to check whether randomization produced an even distribution of important characteristics of mothers and children across conditions.

Second, to examine the success of implementation, descriptive analyses were conducted to check on degree of program participation. Also, structural equation models (SEM) were applied with MPLUS version 5.1 (Muthén & Muthén, 1998-2010) to examine the effect of the program on frequency of alcohol-specific communication, while adding frequency of alcohol-specific communication at baseline as a covariate to the model. We also examined whether maternal alcohol use or alcohol-related problems moderated the association between the program and frequency of alcohol-specific communication.

Finally, to examine the effect of the program on quality of parent-child alcohol-specific communication, alcohol-specific rules, the having of a non-drinking contract, and parental monitoring, SEM models were conducted. Outcome measures at baseline were added to the models as a covariate, because adding strong predictors of the dependent variable can increase reduction in the error of the model, which can subsequently increase statistical power (Maxwell & Delaney, 2004). We examined whether the program had an effect on the outcome measures and whether maternal alcohol use or alcohol-related problems moderated the relation between the program and the outcome measures. In all

the SEM models, we accounted for non-independence of observations due to cluster sampling (Muthén & Muthén, 1998-2010). We also controlled for child gender, age, and living situation. Since all models were saturated (perfect fit), goodness-of-fit statistics were not reported. R-squares were calculated for all models to assess the effect sizes. The trial is registered at [trialregister.nl](http://trialregister.nl), number NTR2474.

## Results

### Sample Equivalence

To examine whether randomization was successful, mother- and child characteristics and the model variables were compared between experimental and control groups. The results (Table 1) showed that there were no significant differences between the experimental and control groups on all variables.

### Intervention Integrity

To assess implementation integrity of the program, mothers and children completed participation records. Of the 108 families participating in the experimental condition, 75% of the children and mothers reported they read and completed at least some parts, of a minimum of 3 out of 5 magazines. A  $\chi^2$  test showed that these numbers did not differ for families in which mothers reported low compared to high amounts of alcohol use in the last week ( $\chi^2 (7, N = 95) = 5.17, p = .64$ ). They also did not differ for families in which mothers reported that they experience some problems compared to no problems due to their drinking ( $\chi^2 (7, N = 94) = 4.39, p = .73$ ).

### Implementation Success

Pearson's correlations showed that frequency of alcohol-specific parent-child communication at wave 1 was significantly correlated with frequency of alcohol-specific parent-child communication at wave 2 ( $r (176) = 0.43, p < .001$ ). Therefore, this variable was added as a covariate in the following analysis. Results (Table 2) showed that the program had a main effect on frequency of alcohol-specific communication. This indicated that the target of the program – improve parental anti-alcohol socialization by means of interactive discussion of parents with their children about alcohol-related topics and rules – was reached. A full model showed that the interaction between condition and maternal alcohol use was not significant. However, the interaction with maternal alcohol-related problems was significant, indicating that frequency of alcohol-specific communication was higher in the experimental condition compared to the control condition, especially for mothers who experienced problems due to their drinking (Figure 1). This means that the effect of the program on frequency of communication was even stronger for dyads in which the mother reported alcohol-related problems.



**Table 1** Sample descriptions and comparison of the experimental vs. control groups at baseline (independent samples t-tests and  $\chi^2$  tests)

Variable	Total Sample (N=213)	Exp. Group (N=108)	Control Group (N=105)	T/ $\chi^2$ (df)
Child sex: n (%)				
Female	108 (50.7)	54 (50.0)	54 (51.4)	0.04 (1)
Male	105 (49.3)	54 (50.0)	51 (48.6)	
Maternal characteristics				
Age: mean (SD)	41.57 (4.4)	41.69 (4.1)	41.39 (4.6)	-0.49 (210)
Low education: n (%)	97 (49.5)	45 (45.9)	51 (53.1)	6.76 (2)
Model variables: mean (SD)				
Maternal alcohol use	2.45 (4.2)	2.81 (3.7)	2.14 (4.7)	-1.15 (211)
Maternal alcohol-related problems	1.09 (.25)	1.10 (.29)	1.07 (.21)	-0.90 (206)
Communication (frequency)	2.14 (.89)	2.09 (.85)	2.19 (.91)	0.89 (210)
Communication (quality)	3.96 (.69)	3.94 (.72)	3.98 (.67)	0.46 (210)
Alcohol-specific rules	1.16 (.23)	1.18 (.25)	1.14 (.20)	-1.20 (210)
Non-drinking contract	.48 (.50)	.44 (.50)	.51 (.50)	0.95 (210)
Monitoring	4.43 (.65)	4.43 (.63)	4.44 (.68)	0.15 (210)

Note. The numbers of observations are less than the total numbers of observations for some variables because of missing data.

**Table 2** Standardized estimates ( $r_2$ ) of the models ( $n = 217$ )

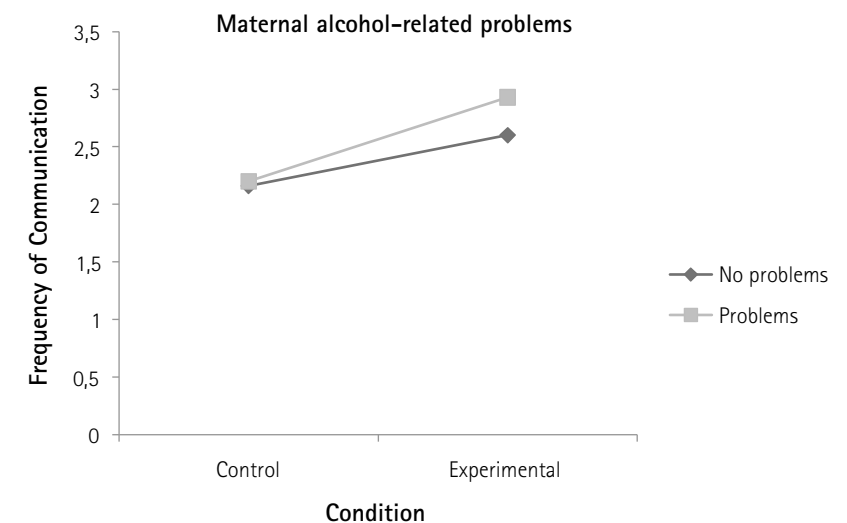
	Condition	Condition*AUM	Condition*ARP
Frequency of Communication	.32*** (.29)	.13 (.30)	.92* (.36)
Quality of Communication	.02 (.33)	.19* (.34)	.80 (.35)
Alcohol-Specific Rules	.04 (.23)	.05 (.23)	-.45 (.24)
Nondrinking Contract	.26*** (.26)	.10 (.27)	-.15 (.29)
Monitoring	.13* (.33)	.05 (.34)	.58 (.35)

Note. AUM = Alcohol use mother, ARP = Alcohol-related problems.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

### Effects on Quality of Communication

Pearson's correlations showed that quality of alcohol-specific parent-child communication at wave 1 and 2 were significantly correlated with each other ( $r(176) = 0.56$ ,  $p < .001$ ). Therefore, quality of communication at wave 1 was added as a covariate in the following analysis. First, the results showed that there was no main effect of condition on quality of alcohol-specific communication. Second, full models showed that the interaction between maternal alcohol use and condition was significant and that the interaction between maternal alcohol-related problems and condition was not significant. This means that children that participated in the program, and of which the mothers drank above average, reported higher quality of communication after the intervention. Figure 2 displays the relationship between maternal drinking and quality of communication across conditions. The program had a positive effect on quality of alcohol-specific communication, but only for those families in which mothers consumed more alcohol than average.

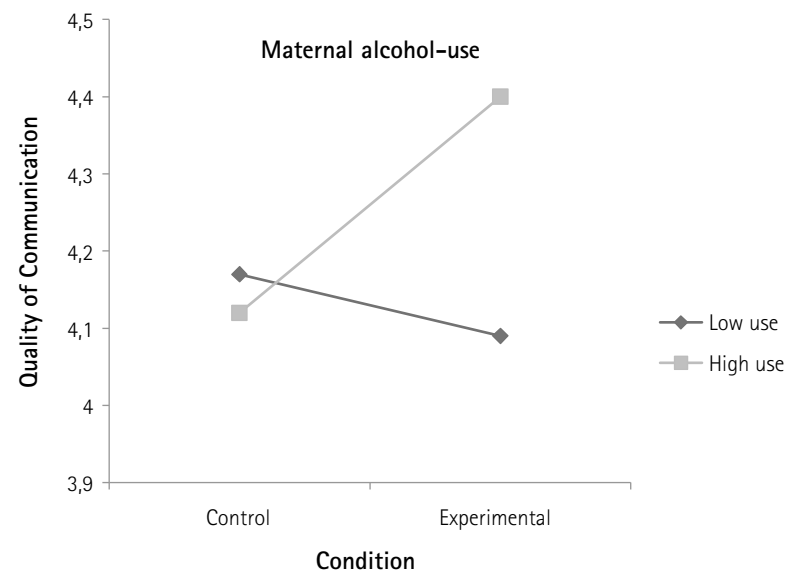
**Figure 1** Frequency of alcohol-specific communication in the two conditions in interaction with maternal alcohol related problems at baseline.

### Effects on rules and monitoring

The results showed that there was no significant effect of condition on alcohol-specific rules. However, the results did show a significant effect of condition on the presence of a non-drinking contract, meaning that mother-child dyads that participated in the program more often reported having a non-drinking contract after the intervention, compared to mother-child dyads that did not participate in the program. Results also showed a significant

effect of condition on parental monitoring, which indicates that dyads that participated in the program reported more parental monitoring after the intervention compared to dyads that did not participate in the program. For all the above outcome measures, there were no significant interaction effects with maternal alcohol use and maternal alcohol-related problems, indicating that the associations between the condition and the outcome measure were the same for all dyads regardless of the mother's drinking habit and alcohol related problems.

**Figure 2** Quality of alcohol-specific communication in the two conditions in interaction with maternal alcohol use at baseline.



## Discussion

Based on current knowledge on alcohol-specific parenting, the "In control! No alcohol" program aimed to engage and enable parents in the anti-alcohol socialization of their children. In the program, parents and their children were encouraged to talk about alcohol while receiving information on improving the quality of parent-child communication, alcohol-specific rules and monitoring. In the present pilot study, we first tested the success of program implementation by examining the effect of the prevention program on the frequency of alcohol-specific communication. The results showed that participation in the program led to an increased frequency of alcohol-specific communication between mothers

and their children, especially when mothers reported problems related to their alcohol use. This finding showed that mother-child dyads participating in the program generally were actively involved in the program by means of engaging in interactive discussions about alcohol. Whereas initial recruitment rates were rather low, both for schools as well as parents and children, these were similar to other prevention studies (Heinrichs, Bertram, Kuschel, & Hahlweg, 2005; Komro et al., 2006) and retention rates were high. Following, while participation records showed that completion of all five magazines was rather exceptional, the majority of dyads completed over half of the program, which is in accordance with other comparable programs (Bauman et al., 2002; Engels et al., 1999). Thus, implementation of the program was relatively successful.

The effect of the program on the quality of alcohol-specific communication was positive. The "In control: No alcohol!" program led to an increase in quality of alcohol-specific communication, but only for those dyads in which mothers' alcohol use was above average. Although the program initially aimed to improve quality of communication for the whole group, there are several possible explanations for the finding that the program only improved quality for this subgroup.

A reason why drinking mothers are more strongly influenced by the program might be that they are more strongly motivated and involved in the program, as it is more relevant for them compared to light drinking or abstaining mothers. This is underlined in the Health Belief Model (Janz & Becker, 1984), which states that the effect of an intervention is dependent upon the degree to which individuals perceive they are susceptible to the specific condition. In the "In control: No alcohol!" program, information is provided about the risk of parental drinking and its related problems, in raising the chance of early and excessive alcohol use in their children (Tildesley & Andrews, 2008). Of course, this information is more relevant for alcohol using mothers and can raise their feeling of susceptibility or vulnerability to this risk compared to abstaining mothers. Therefore, these mothers might be more motivated compared to light drinking or abstaining mothers to change their behavior. This process is acknowledged by social cognitive theory (Bandura, 2004), upon which the intervention is partially based. According to this theory, improving self-efficacy is an important contributor to the success of a prevention program (Rosenstock, Strecher, & Becker, 1988). The "In control: No alcohol!" program partly focuses on increasing the comfort level and confidence of alcohol using mothers in communicating with their children about alcohol. This might have led to increases of self-efficacy in this subgroup of mothers. Concluding, both the heightened susceptibility, motivation, and self-efficacy of mother-child dyads, in which mothers use alcohol above average could explain why we only found effects on quality of alcohol-specific communication for this group.

Contrary to our hypotheses, the "In control: No alcohol!" program had no effect on alcohol-specific rules. However, the program did have a positive effect on the presence of a non-drinking contract and monitoring. Parents and children that participated in the program were more likely to have executed a non-drinking contract compared to parents

and children that did not participate in the program. The lack of findings on alcohol-specific rules could be explained by the fact that these children were rather young. Parents of children in this age range are not permissive towards children's alcohol use to start with. Therefore, there is little to no room for improvement of these rules, as reported by the children in the questionnaires. However, the fact that we did find a positive effect on the existence of a non-drinking contract indicated that parents and children had more thorough discussion on what is and what is not allowed with regard to drinking alcohol in the future. In accordance with the hypotheses, we found a positive effect of the program on general maternal monitoring of the child. Parents were more likely to monitor their child's behavior after they participated in the program. These results indicate that the "In control: No alcohol!" program had some positive effects on the alcohol-specific socialization strategies parents use.

The present pilot study put forward some directions for future research on and implementation of the "In control: No alcohol!" prevention program. First, the present study lacks information on the effect of the program on the actual alcohol use of the adolescents. The program is targeted at elementary school children, while most Dutch children get in touch with alcohol at a regular base at secondary school (Monshouwer et al., 2008). A longitudinal follow-up study with a larger, representative sample is recommended in which the behavioral effects of the program on adolescent alcohol use will be tested. Second, the sample used in this pilot study was mainly from a rural and religious area. Therefore, the sample is relatively well-behaved, with low maternal alcohol use rates and high quality of alcohol-specific communication reports. These quality of communication reports tended to show a ceiling-effect, which might have reduced the ability of assessing improvement. Future research should focus on the full range of Dutch families, and include participants from urban as well as rural areas and several SES groups, resulting in a more diverse sample. Further, the current program only targeted the mothers as socializing agents of their children. According to social cognitive theory, there are multiple socializing agents, like parents, but also peers. These different socializing agents can influence the child, but they can influence each other as well (Vandell, 2000). While the program did incorporate discussion between parents and their children on the influence of for example peers and the media on alcohol use, it did not directly target the peers of the child, as in for example a school-based program. However, programs targeting parents and their children have shown to be most effective in preventing children from drinking alcohol early and excessively (Koning et al., 2009; Koutakis et al., 2008; Kumpfer et al., 2003; Smit et al., 2008). Finally, for several practical reasons, the present study focused on mothers instead of both parents. However, previous research has shown differences in communication about alcohol with their children between mothers and fathers, with mothers communicating more often (Van der Vorst et al., 2005; Van der Vorst, Burk, et al., 2010) and being more understanding (Noller & Callan, 1990) compared to fathers. In future research, the effect of the program, when targeted at fathers, should be taken into account as well.

Despite these limitations, this program was the first to target mother-child communication in an at home intervention with elementary school children in the Netherlands. Early prevention is important, since delaying the age of the first alcohol consumption results in a lower risk of several alcohol-related problems (Behrendt et al., 2009; Englund et al., 2008). Further, the program was completed by the mothers and their children in their home environment at a time of their choice. This created the opportunity to reach a wide array of parents - including parents who drink alcohol - and their children and made the program easily accessible to them. In conclusion, the present study showed that the "In control: No alcohol!" program resulted in an increase in quality of alcohol-specific mother-child communication in families with maternal alcohol use. It also showed that the program resulted in mothers and children engaging in a non-drinking contract and mothers monitoring their children's behavior more closely. While the results of the present pilot study are promising, replication with a larger sample size and a long-term follow up assessment including a behavioral assessment of alcohol use will be necessary.

# Chapter 10

## Mediation and moderation effects of an in-home family intervention: The "In control: No alcohol!" Pilot Study



### Published as:

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## Abstract

The aim of this study was to examine the effect of a theory-based in-home family intervention (In control: No alcohol!) on adolescent alcohol cognitions via its putative mediators using a randomized controlled design. In the region South-Holland of the Netherlands a total of 213 children (11-12 years) and their mothers were randomly assigned to the prevention program (108 dyads) and the control condition (105 dyads). Mediation effects were analyzed using pretest and two follow-up measurements (five and 12 months after baseline). A path model was estimated (using Mplus) to examine the effect of the intervention on the putative mediators (frequency- and quality of mother-child communication, rules about alcohol, establishing a non-drinking agreement and parental monitoring of the child's whereabouts). Outcomes were adolescents' perceived harmfulness of drinking and intention to drink. Multi-group analyses were performed to examine potential differences across gender. The program led to an increase in frequency of alcohol-specific communication, non-drinking agreements and parental monitoring. Moreover, adolescents in the experimental condition perceived drinking to be more harmful and had less intention to drink compared to adolescents in the control condition. The effect of the program on adolescent alcohol cognitions was significantly mediated through having more frequent conversations about alcohol, yet only among boys. Although results on actual drinking need to be added, findings indicate that this relatively inexpensive, easy-to-administer home intervention is promising.

## Introduction

As in other European countries, underage drinking in the Netherlands is common practice (Hibell et al., 2009). In the last year of elementary school, 29 percent has had their first drink and five percent drank alcohol recently (van Dorsselaer et al., 2010). After the transition to secondary education (average age of 12), the prevalence of recent drinking has doubled. Underage drinking has been clearly related to an elevated risk at physical and social problems; may permanently affect the development of the brain and predicts alcohol problems later in life (Bonomo et al., 2001; DeWit, Adlaf, Offord, & Ogborne, 2000; Tapert, Granholm, Leedy, & Brown, 2002).

Social cognitive theory states that parents are the main socialization agents in their child's development (Bandura, 1986). In accordance, in trying to delay or reduce adolescent drinking, family based programs have effect-sizes that are 2-9 times greater than programs that are only child focused (Kumpfer et al., 2003; Velleman, 2009). In addition, there is emerging evidence that family interventions, targeting both parent and child, have a higher efficacy than programs that are solely parent focused (Koning et al., 2009; Velleman, 2009). Thus, targeting both parent and child may be crucial to the success of alcohol prevention.

Another crucial factor is the time to intervene. In specific, family programs may be less effective when children are at an older age or already drink at baseline (Loveland-Cherry, Ross, & Kaufman, 1999; Van der Vorst et al. 2006). Petrie, Bunn, and Byrne (2007) report "the transition from primary to secondary school" to be an effective time to intervene. Thus, targeting families before the transition to secondary school may be promising in preventing early drinking.

Despite the growing evidence of efficacy of family interventions in preventing underage drinking, the active ingredients have rarely been studied. Most commonly, family programs target general parenting practices, like attachment, conflict management, discipline and monitoring (Hawkins et al., 1997; White et al., 2000). Although family programs have been reported to significantly increase e.g. parental monitoring (Kumpfer, Whiteside, Greene, & Allen, 2010; Spoth, Redmond, & Shin, 1998), to our knowledge, universal family interventions aimed to prevent underage drinking have never demonstrated significant mediation through general parenting practices.

Recent longitudinal studies have shown that alcohol specific parenting behaviors are at least as important predictors of underage drinking as general parenting practices. For example, providing restrictive rules about alcohol use appears to be effective in delaying and reducing adolescent drinking (Van der Vorst et al., 2006; Yu, 2003). Although parents express these rules via alcohol-specific conversations (Ennett, Bauman, Foshee, et al., 2001), the findings concerning alcohol-specific parent-child communication are not as unambiguous. While some studies show frequent alcohol-specific communication to reduce early drinking (Martyn et al., 2009; Pasch et al., 2010), others do not find an association (Van den Eijnden et al., 2011) or even suggest frequent alcohol-related conversations to

increase alcohol use among early drinkers (Ennett, Bauman, Foshee, et al., 2001; Van der Vorst, Burk, et al., 2010). Possibly, the frequency of conversations does not inform us about the exact content (e.g. which rules) or the quality of the communication (e.g. the level of respect). Indeed, several studies showed that instead of frequent talks about alcohol, a few solid conversations about alcohol are more effective in preventing adolescent drinking (Miller-Day & Kam 2010; Spijkerman et al., 2008). Though the evidence of efficacy on early drinking varies between alcohol-specific parenting factors, family programs are found to improve alcohol-specific parenting, like norms on drinking (Spath et al., 1998), rules about alcohol (Ennett, Bauman, Pemberton, et al., 2001; Koning, Van den Eijnden, Engels, et al., 2011), non-drinking agreements and communication about alcohol (Mares, Van der Vorst, et al., 2012). Yet, the small number of studies that tested mediation show inconsistent findings: altered alcohol-specific parenting, like more strict rules about alcohol explained part of the success of a family program (Koning, Van den Eijnden, Engels, et al., 2011), while the effect of another did not (Ennett, Bauman, Pemberton, et al., 2001). Still, it is unclear whether and which parenting factors account for the efficacy of family programs in reducing early drinking.

### Gender differences

Parent-child relationships differ for boys and girls. For instance, girls talk in general more to their mothers than boys do (Noller & Callan, 1990). Yet, mothers ask their sons more questions about alcohol (Boone & Lefkowitz, 2007) and are more permissive towards their daughters (Reimuller, Hussong, & Ennett, 2011). In accord, parenting behavior may impact boys and girls differently (Kumpfer, Smith, & Summerhays, 2008). Still, the efficacy of family programs in preventing adolescent drinking across gender is unclear. A few studies testing the efficacy of family programs in preventing substance use across gender showed mixed results (Jones et al., 2005; Pilgrim, Abbey, Hendrickson, & Lorenz, 1998; Trudeau, Spoth, Randall, & Azevedo, 2007). Although inconclusive, these studies may indicate the existence of diverging efficacy of family programs across gender. In accord, subgroup analyses by gender are recommended when studying interventions that intend to be universally effective (Kumpfer et al. 2008).

### The current study

'In control: No alcohol!' is a recently developed universal family intervention aimed to prevent alcohol use among elementary school children (11 years old) right before they transit to secondary education. This in-home family program targets both mothers and their children individually and together. The program structure is derived from two theories: Social Cognitive Theory (Bandura, 1986) and the Elaboration Likelihood Model (Petty & Cacioppo, 1986). Fundamentals of child socialization (Bandura, 1986) consisted of how children perceive and learn from their environment (i.e. their parents and their behaviors). The Elaboration Likelihood Model of persuasion states that participants can differ in the

degree to which they experience the program being relevant or obvious. While designing the prevention content and layout both models of information processing are taken into account. Additionally, recent studies (Southwell & Yzer, 2007; Van den Putte, Yzer, Southwell, de Bruijn, & Willemsen, 2011) have underlined the importance of interpersonal communication as a possible mediator between public health messages and substance use. In accord, the "In control: No alcohol!" program is designed to stimulate mother-child interpersonal communication about alcohol.

In an earlier report on the post-test outcomes (Mares, Van der Vorst, et al., 2012), this pilot RCT has been shown effective in altering a number of general and alcohol-related parenting behaviors: parental monitoring, alcohol-specific communication and the establishment of a non-drinking agreement. The present study evaluates the one-year follow-up effects of this intervention on parenting behaviors as well as on adolescent alcohol cognitions. As drinking in this sample is still rather scarce, adolescents' alcohol cognitions are included as expressed in adolescents' perceived harmfulness of drinking and their intention to drink, as these are known predictors of adolescent drinking (Hawkins et al., 1997; Marcoux & Shope, 1997). The main aim is to study whether the intervention changes adolescents' alcohol cognitions and whether the program-induced parenting factors are accountable for the expected change. Next, we explore gender differences in program effects and mediation paths. To our knowledge, this is the first in-home family intervention aimed to prevent early drinking among primary school children in the Netherlands which effect is tested on parent and child factors using an RCT design.

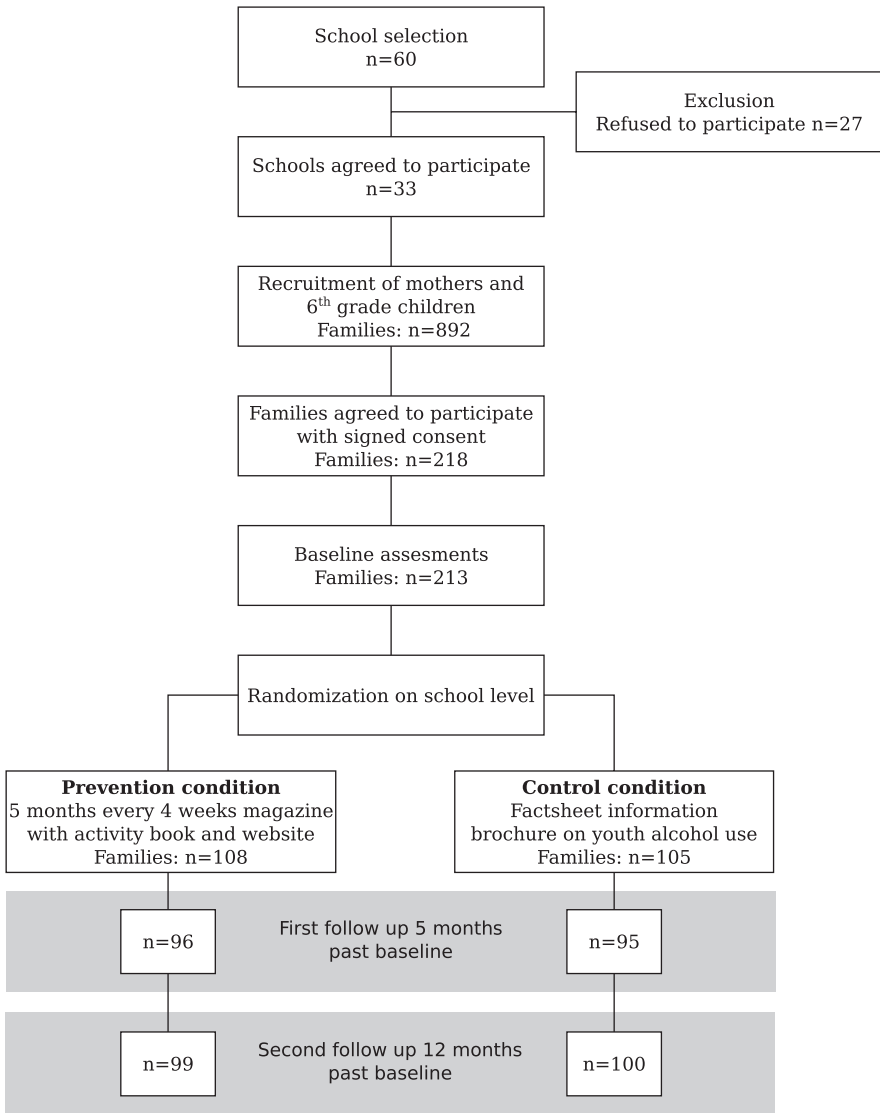
## Method

### Design and procedure

In May 2009, we randomly selected 60 schools from a list of primary schools in the region South-Holland of the Netherlands. 33 schools were willing to distribute recruitment materials to a total of 892 fifth graders. Materials included an information letter about the program and research project and an application form including signed consent, which 218 mothers sent back. We randomly assigned these families to either the intervention or the control condition. More detailed information on the randomization is reported by Mares, Van der Vorst, et al. (2012). Mothers and children completed an online questionnaire at home on a secured webpage, which was sent to them separately by e-mail. The first questionnaire was sent in November 2009 (T0), the second (T1) in April 2010 after program completion, and again in November 2010 (T2) (Figure 1).



Figure 1 Flow of participants through the trial.



### Participants

At the start of the program 105 families in the control group and 108 families in the program group still agreed to participate. The majority of participating families were of Dutch origin (> 95%). Child's gender was almost equally divided (50.7% girls). Child's mean age was 11.3 ( $SD = .52$ ; range 10-13) and mothers' mean age was 41.6 ( $SD = 4.4$ ). (Table 1)

### Loss to follow-up

A total of 191 adolescents (89.7%) and their mothers at T1, and 199 (93.4%) at T2 stayed in the program and completed the follow-up assessments after 5 and 12 months, respectively (Figure 1, available online). No differences between completers and dropouts were observed for adolescents' age, gender and living situation, mothers' alcohol use (numbers of glasses per week) and mothers' education. Children who did not participate in the first follow-up differed from completers in having more alcohol-specific conversations with their mothers ( $T0: t = 3.18, p = .002$ ). No differences in frequency of communication were found between completers and dropouts at the second follow-up. Also, no differences between completers and dropouts were observed for all other model variables (putative mediators and outcome variables) as assessed at baseline.

### The Intervention

This recently developed alcohol-prevention program is based on the principles of a smoking prevention program called "Smoke-free Kids" (Jackson & Dickinson, 2003). The focus of that program is on enabling parents to prevent their children from smoking. It has been shown to be effective in a sample of U.S. families (Jackson & Dickinson, 2006) and is currently being tested in a sample of Dutch families (Hiemstra et al., 2009). While designing the alcohol-prevention program, adjustments have been made, based on recent evidence on alcohol-specific socialization, e.g. setting strict rules about alcohol, communicating constructively about alcohol issues, and monitoring daily activities (Koning et al., 2010; 2012; Van der Vorst et al., 2005; 2006; Yu, 2003).

The intervention consisted of five magazines, eight pages each, which were mailed monthly to the homes of families in the intervention condition with an interval of four weeks, starting in December 2009. Each of the five magazines includes information for mothers and games and assignments for mothers and children to complete together addressing different important issues regarding youth alcohol use and child socialization. The program is relatively inexpensive as parent-child dyads independently work through the program and no teachers or trainers are required. The main approaches of alcohol-specific child socialization addressed are communication, rule setting, and monitoring. Magazine 1 consists of general information about alcohol, alcohol use among children and the importance of parenting behavior, such as anti-alcohol norms and parental supervision. Magazine 2 addresses the risks of alcohol use, especially among children, and parental

attitudes towards early drinking. Magazine 3 focuses on parental modeling of alcohol use and the efficacy of setting clear rules about alcohol. Magazine 4 is aimed at increasing awareness about peer influence and increasing the ability to handle peer pressure, while magazine 5 discusses the impact of alcohol-related media and again stresses the value of setting strict rules. In addition, each magazine contains general information and practical tips on high-quality communication. A website and accompanying logbook provided additional information, games and assignments for the adolescent to complete every month. 75% of the dyads reported they took part in at least 3 of 5 magazines, suggesting successful implementation (Mares, Van der Vorst, et al., 2012).

Participating families in the control condition received a single brochure about alcohol and parenting once in January 2010. This brochure is the standard parent alcohol brochure at 'the Netherlands Institute of Mental Health and Addiction' (treatment as usual).

## Measures

Both mediators (parenting behaviors) and outcomes variables (child behaviors) were assessed at baseline (T0), at the first (T1) and the second follow-up (T2).

**Frequency of alcohol-specific communication.** A Dutch translation of the alcohol-specific communication scale of Ennett and coworkers (Ennett, Bauman, Foshee, et al., 2001) was used to assess eight specific domains of parent-child communication on alcohol (Van der Vorst et al., 2005). Domains include negative consequences of use, peer pressure resistance, media portrayal of alcohol and rules about alcohol use. Children reported how many times they talked about these topics with their mothers in the last twelve months on a Likert scale ranging from 1 (*never*) to 5 (*very often*). Cronbach's alpha ranged from .90 to .91.

**Quality of alcohol-specific communication.** Children were asked about the quality of maternal communication about alcohol with six items, such as "My mother and I are interested in each other's opinion about alcohol" (Spijkerman et al., 2008). Response categories ranged from 1 (*completely untrue*) to 5 (*completely true*), of which mean scores were computed. A high mean on this score reflected a high quality of communication about alcohol. Cronbach's alphas were respectively .78; .82 and .79 for the three waves.

**Alcohol-specific rules.** A 10-item scale (Van der Vorst et al., 2005) was adjusted for elementary school children (resulting in 11 items) and used to assess children's view on parental alcohol-specific rule-setting. An example item is "are you allowed to drink a nip of alcohol in the absence of your parents?", with response categories ranging from 1 (*definitely not*) to 5 (*definitely*). Responses were reverse scored, i.e. a higher mean reflects more restrictive alcohol-specific rules. Alphas were .74; .83 and .90, respectively.

**Non-drinking agreement.** Children were asked "Do you have an agreement with your parents that you will not drink until a certain age?" Response categories were "no" and "yes, I am not allowed to drink until I am...years old" (Mares, Van der Vorst, et al., 2012).

**Monitoring.** Three items were used to ask children whether their parents solicited information on the child's whereabouts and whether the child needed parental permission

to go out (Kerr & Stattin, 2000). Response categories ranged from 1 = *never* to 5 = *always* with higher means reflecting more parental monitoring. Alphas were .65; .75 and .67, respectively.

**Perceived harm of drinking.** Children were asked "How harmful (physically or in other ways) do you think it is for adolescents under 16 (the legal age of drinking in the Netherlands) to drink 1) occasionally 2) one or two glasses every day and 3) five or more glasses every weekend". Response categories ranged from 1 (*not harmful*) to 4 (*very harmful*). Alphas were .65; .70 and .71, respectively.

**Intention to drink.** At the first and second wave (T0 and T1) adolescents were asked two questions about their intention to drink beer or wine. E.g. "Do you think you would drink beer when you're a grown-up?" Response categories were 1 (*no*), 2 (*maybe*), 3 (*yes*). At the third wave (T2) a single question was used to ask adolescents whether they intended to drink alcohol in the next year. Response categories ranged from 1 (*absolutely*) to 4 (*absolutely not*). Responses were reverse scored, i.e. higher scores indicate a stronger intention to drink.

## Strategy of Analysis

Means and standard deviations of demographic variables of adolescents and mothers at baseline were computed per condition to check whether randomization resulted in an even distribution across conditions (Table 1). Correlations between intervention-targeted behaviors were estimated (Table 2).

To examine the effect of the program at the second follow-up, SEM (Structural Equation Modeling) was conducted using Mplus 5.0 (Muthén & Muthén, 1998-2010). In addition to Mares, Van der Vorst, et al. (2012) who examined the effects on parent factors at the first follow-up, we estimated the program effects at the second follow-up (12 months past baseline; T2) on both parent and adolescent factors. No missing data on item-level appeared due to zero-non-response on item-level. Missing data due to loss-to-follow up were handled using full information maximum likelihood (Muthén & Muthén, 1998-2010). Consequently, in accord with the intent-to-treat principle, all families that were randomized were included in the analyses.

The mediating effects of the program-induced adolescent and parent behaviors were analyzed using path modeling. First, it was tested whether the program had an effect on parent factors (putative mediators). Second, the effect of the putative mediators on the outcome variables was analyzed. Finally, it was tested whether the size of the mediation paths (indirect intervention effect) were statistically significant (Bryan, Schmiede, & Broadus, 2007). We measured mediators at the first follow-up (T1) and outcome variables at the second follow-up (T2), so that actual change over time and mediation could be measured. Pre-treatment scores (T0) for the putative mediations were included in the model as control variables so that post-test scores result in a residual change variable (Cole & Maxwell, 2003). Outcomes were allowed to correlate. Mediation was tested using

bias-corrected bootstrapped confidence intervals as these provide the most accurate Type I and Type II error rates (MacKinnon et al., 2004).

To examine whether mediation paths are equal among genders multi-group analyses were run for boys and girls. We tested whether paths significantly differed across gender using chi-square (Wald) tests. Although an earlier study found no effect on some of the parent factors at T1, we decided to keep all parenting factors into the mediation model for moderation purposes. That is, despite the lack of an overall effect on these parenting factors, the intervention may influence these parenting factors in a subgroup of the population.

All models controlled for child gender, age and living situation at baseline (Mares, Van der Vorst, et al., 2012). Design effects were estimated to decide on accounting for non-independence due to cluster-sampling. As design-effects for both outcome measures were small ( $< 2$ ), accounting for cluster-sampling was not imperative (Kish, 1965; Muthén & Satorra, 1995). To evaluate the model fit we used the comparative fit index (CFI) and the root mean square error of approximation (RMSEA). Chi-square values, degrees of freedom and p-values are reported but are less suitable to assess the model fit.

Results

At baseline no significant differences were observed between the experimental and the control group for all model variables as well as on all demographic variables (Table 1). Table 2 reports the inter-correlations among mediators and outcome variables. Apart from non-drinking agreement, all putative mediators (parenting behaviors) correlated with one or both outcome measures (adolescent alcohol cognitions).

Follow-up effects (T2) on parent and adolescent targeted behaviors

As reported earlier (Mares, Van der Vorst, et al., 2012) three out of five parent-targeted behaviors (T1) altered significantly due to the intervention. That is, mother-child dyads in the intervention condition more often had alcohol-related conversations, more often had a non-drinking agreement, and reported more parental monitoring compared to controls. Longer term follow-up effects (T2) indicated that the intervention induced increase in alcohol-specific communication ( $b = .20, p = .001$ ) and non-drinking agreement ( $b = .21, p = .001$ ) remained at T2 (Table 3). The intervention effect on parental monitoring was not significant at T2 ( $b = .08, p = .21$ ). In addition, the program had no effect on quality of alcohol-related communication ( $b = .04, p = .50$ ) and alcohol-specific rules ( $b = -.004, p = .96$ ) at T2. Moreover, results revealed that adolescents in the intervention condition perceived drinking to be more harmful ( $b = .19, p = .004$ ) and had less intention to drink ( $b = -.19, p = .006$ ) at T2 compared to controls (Table 3).

Table 1 Baseline characteristics of adolescents and mothers (independent samples t-tests and  $\chi^2$  tests)

Variable	Total Sample (N=213)	Experimental Group (N=108)	Control Group (N=105)	T / $\chi^2$
<b>Child characteristics:</b>				
Gender: n (%) boys	105 (49.3)	54 (50.0)	51 (48.6)	.04
Age: mean (SD)	11.3 (.52)	11.3 (.52)	11.3 (.53)	.14
<b>Maternal characteristics</b>				
Age: mean (SD)	41.6 (4.4)	41.7 (4.1)	41.4 (4.6)	-.49
Low education <sup>a</sup> : n (%)	97 (49.5)	45 (45.9)	51 (53.1)	6.93
Single parent family: n (%)	29 (13.7)	17 (15.7)	12 (11.5)	.79
<b>Model variables: mean (SD)</b>				
Frequency of alcohol-specific communication	2.14 (.89)	2.09 (.85)	2.19 (.91)	.89
Quality of alcohol-specific communication	3.97 (.68)	3.94 (.71)	4.00 (.65)	.54
Alcohol-specific rules	4.84 (.23)	4.82 (.25)	4.86 (.20)	1.20
Non-drinking contract	.48 (.50)	.44 (.50)	.51 (.50)	.90
Monitoring	4.43 (.65)	4.43 (.63)	4.44 (.68)	.15
Perceived harm of drinking	3.30 (.50)	3.30 (.48)	3.30 (.51)	.12
Intention to drink	2.09 (.66)	2.14 (.68)	2.05 (.64)	-1.00

Note: The numbers of observations are less than the total numbers of observations for some variables because of missing data. SD: standard deviation.  
<sup>a</sup>Elementary school or a low educational level of Dutch secondary school

**Table 2** Correlations between the intervention targeted parent and adolescent behaviors.

Variables	1	2	3	4	5	6
1. Frequency of alcohol-specific communication (T1)	-					
2. Quality of alcohol-specific communication (T1)	.27***	-				
3. Alcohol-specific rules (T1)	.11	.22**	-			
4. Nondrinking agreement (T1)	.26**	.10	.01	-		
5. Monitoring (T1)	.10	.33***	.23**	-.06	-	
6. Perceived harm of drinking (T2)	.16*	.18*	.23**	-.04	.14	-
7. Intention to drink (T2)	-.11	-.22**	-.30***	-.03	-.19*	-.18

Note. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

**Table 3** Intervention effects at 5 months and 12 months following baseline (standardized estimates of the models) ( $n = 213$ ).

	Follow-up (T1) (5 months)	Follow-up (T2) (12 months)
<b>Parenting behaviors (mediators)</b>		
Frequency of alcohol-specific communication	.31***	.20**
Quality of alcohol-specific communication	.02	.04
Alcohol-Specific Rules	.01	.00
Nondrinking agreement	.26***	.21***
Monitoring	.13*	.08
<b>Child behaviors (outcomes)</b>		
Perceived harm of drinking	.15*	.19**
Intention to drink in the next year	.01	-.19**

Note. Univariate models are all saturated and thus have perfect model fit.  
\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

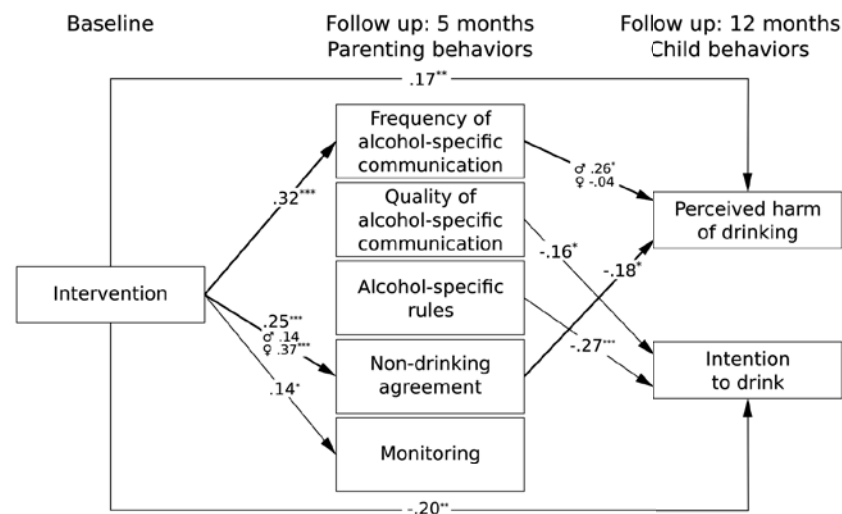
**Mediation model**

Figure 2 reveals the results of the mediation model (model fit:  $\chi^2 = 66.8(57)$ ,  $p = .18$ ; CFI = .98; RMSEA (90% CI) = .03 (.00, .05)). In consistence with the simple models (Table 3), the intervention significantly predicted frequency of alcohol-specific communication ( $b = .32$ ,  $p < .001$ ), non-drinking agreement ( $b = .25$ ,  $p < .001$ ) and monitoring ( $b = .14$ ,  $p = .03$ ) at T1. In turn, non-drinking agreement predicted perceived harm of drinking negatively ( $b = -.18$ ,  $p = .008$ ). The (negative) indirect effect of the program through non-drinking agreement was statistically significant (unstandardized  $b = -.05$ , bias corrected 95% CI =  $-.10$ ,  $-.01$ ). That is, the intervention predicted non-drinking agreements between mother-child dyads whereas such an agreement was associated with less perceived harm of drinking among the adolescents (the opposite of what was intended). Furthermore, adolescents' intention to drink at T2 was significantly predicted by quality of communication ( $b = -.16$ ,  $p = .02$ ) and alcohol-specific rules ( $b = -.27$ ,  $p < .001$ ) at T1. Direct effects of the program on perceived harm of drinking ( $b = .17$ ,  $p = .009$ ) as well as adolescents' intention to drink ( $b = -.20$ ,  $p = .004$ ) remained significant. That is, adolescents in the intervention condition perceived drinking as more harmful and had less intention to drink compared to controls, which could not be explained by the intervention-induced parenting factors.

**Multi-group analyses**

We performed multi-group analyses to examine whether mediation paths differed across gender. The constrained model showed a significantly worse fit than a model in which paths were freed to vary across groups ( $\Delta\chi^2 = 102.8$ ,  $\Delta df = 70$ ,  $p = .007$ ), which suggests significant differences in magnitudes of path coefficients across gender. Similarities as well as differences between boys and girls were observed in the mediation part of the model. Both boys and girls had more frequent conversations with their mother about drinking due to the intervention (Boys:  $b = .30$ ,  $p = .001$ ; Girls:  $b = .32$ ,  $p < .001$ ; Wald test =  $.15(1)$ ,  $p = .70$ ). Besides, having frequent conversations about alcohol was associated with more perceived harm of drinking among boys ( $b = .26$ ,  $p = .01$ ), but not among girls ( $b = -.04$ ,  $p = .68$ ), a difference that is statistically significant (Wald test =  $4.59(1)$ ,  $p = .03$ ) (Figure 2). Hence, among boys a significant indirect program effect on perceived harm of drinking was observed through frequent conversations about alcohol (Indirect effect: unstandardized  $b = .08$ , bias corrected 95% CI =  $.01$ ,  $.19$ ). Differences across gender were also observed for non-drinking agreements. That is, girls in the intervention group settled a non-drinking agreement with their mothers more often than girls in the control group ( $b = .37$ ,  $p < .001$ ), while boys did not ( $b = .14$ ,  $p = .15$ ) (Wald test =  $3.99(1)$ ,  $p < .05$ ) (Figure 2). Still, having such an agreement was associated with less perceived harm of drinking; an association that did not significantly differ across gender (Wald test =  $.75(1)$ ,  $p = .39$ ). The program effect on monitoring did not significantly differ between boys and girls (Wald test =  $.83(1)$ ,  $p = .36$ ). Last, in agreement with findings for the total group, the intervention had no effect on quality of communication and alcohol specific rules. Still, quality of

**Figure 2** Results of the mediation analyses of the intervention targeted parent and adolescent behaviors. Standardized path coefficients for the total group and multi-group analyses.



**Notes:**

Model 1 (total group), model fit:  $\chi^2 = 66.8$  (57),  $p = .18$ ; comparative fit index (CFI) = .98; root mean square error of approximation (RMSEA) (90% CI) = .03 (.00 – .05). Significant indirect effect on perceived harmfulness through non-drinking agreement: unstandardized  $b = -.05$  (bias corrected 95% CI = -.10, -.01).

Model 2 (moderation for gender), model fit:  $\chi^2 = 158.4$  (110),  $p = .002$ ; CFI = .91; RMSEA (90% CI) = .06 (.04 – .09). Significant indirect effect for boys on perceived harmfulness through frequency of communication: unstandardized  $b = .08$  (bias corrected 95% CI = .01, .19).

Outcomes were allowed to correlate.

Paths are only depicted when significant for the total group or when significant differences existed across gender. Bold arrows indicate significant mediation.

communication and rules about alcohol were associated with less intention to drink; associations which did not differ across gender (Wald test = 2.61 (1),  $p = .11$  and 2.15 (1),  $p = .14$ , respectively). (Figure 2)

Direct intervention effects on adolescent alcohol cognitions did not significantly differ across gender (perceived harm of drinking: Wald test = .99 (1),  $p = .32$ ; intention to drink; Wald test = .58 (1),  $p = .45$ ).

In sum, direct intervention effects on adolescent alcohol cognitions did not significantly differ across gender, whereas only among boys a significant indirect effect was observed through having frequent conversations about drinking.

## Discussion

### Main findings

This study is the first to investigate the effects of the "In control: No alcohol!" family program on both mother and child outcomes. Notably, children perceive alcohol to be more harmful and have less intention to drink, due to this inexpensive, easy-to-administer in-home family program. In addition, mother-child dyads more often settled a non-drinking agreement (which appeared to be negatively related to adolescents' perceived harm of drinking) and increased their alcohol-related conversations compared to their control dyads. The efficacy of the program on adolescent alcohol cognitions did not differ across gender. Still, mother-daughter dyads (counterproductively) established a non-drinking agreement more often than control-dyads. Moreover, the raise in alcohol-related conversations among mother-son dyads explained part of the increase in perceived harm of drinking among boys, yet not among girls.

Notably, this easy-to-administer in-home family program resulted in more aversive alcohol cognitions. Moreover, these effects are stronger at T2 compared to T1. This finding is in line with a meta-analysis (Smit et al. 2008) and two recent RCTs (Koning, Van den Eijnden, Verdurmen, Engels, & Vollebergh, 2011; Spoth et al., 2011) who found program effects on adolescent drinking to become stronger over time. The longer term effects of the "In control: No alcohol!" intervention are promising, especially taking into account that at T2 children have moved to secondary education, when their cognitions may become increasingly positive towards drinking. Since program effects become stronger over time, the change in alcohol cognitions due to the "In control: No alcohol!" program might be an important step in delaying adolescent actual drinking later on.

In line with our hypothesis, mother-child dyads increased their alcohol-related conversations compared to controls. Moreover, among boys the increase in conversations about alcohol with their mothers resulted in more perceived harm of drinking. Hence, an indirect effect (mediation) was observed through mother-child conversations about alcohol, yet only among boys. Van der Vorst, Burk, et al. (2010) also observed gender differences in the impact of frequent alcohol conversations on adolescent drinking. Still, the authors found that frequent parental communication did not result in positive outcomes among heavy drinking boys, possibly due to an unconstructive way of discussing drinking. In contrast, our results show that more frequent communication leads to more positive outcomes among 12 year old boys. Possibly, the "In control: No alcohol!" program realizes more constructive alcohol-related conversations among mother-son dyads, which in turn brings about more aversive alcohol cognitions. Still, this study does not tell us why frequent conversations about alcohol differently affect boys' and girls' alcohol cognitions. Various explanations may be mentioned. First, boys may benefit more from programs shortly after implementation, whereas profits for girls may emerge later and are longer lasting (SAMHSA 2002; Trudeau et al., 2007). Second, our sample might have been too small to detect



significant mediation paths among girls. Third, the mechanism through which parents impact adolescent alcohol cognitions may differ across gender. Longitudinal studies found parenting factors that predict adolescent drinking, to vary in the strength of their influence on boys and girls (Danielsson, Romelsjö, & Tengström, 2011; Kelly et al., 2011; Kumpfer et al., 2008). In specific, alcohol-specific parenting (e.g. parental disapproval), might play a stronger role in preventing alcohol use among boys, whereas general parenting (e.g. family bonding) may be more effective among girls (Kumpfer et al., 2008). Our findings suggest that, apart from the aforementioned parenting practices, alcohol-related conversations may vary in the strength of their impact on boys and girls. More research, using longer term follow-up assessments and larger samples, is needed 1) to clarify how parent-child conversations impact alcohol use throughout adolescence, as well as 2) to confirm whether the impact of general and alcohol-specific parenting on early drinking differs across gender.

Remarkably, a significant (negative) indirect effect was observed through the settling of a non-drinking agreement. As expected, mother-child dyads in the program condition more often than controls settled a non-drinking agreement. Yet, settling a non-drinking agreement predicted less perceived harm of drinking, while an increase was expected. Although settling a non-drinking agreement is common in the Netherlands (van Dorsselaer et al., 2010), no longitudinal studies have examined its relation with underage drinking. Possibly, settling a non-drinking agreement may be a relatively simple tool to prevent early drinking, whereas the current literature underlines the need of "a more detailed and complex parent-child communication" to prevent early drinking (Miller-Day & Kam, 2010). Besides, parents may (unintended) give a permissive instead of an anti-alcohol message (Reimuller et al., 2011). Next, adolescents may internalize parental messages differently depending on their drinking experience and their preexisting beliefs about e.g. the harm of drinking (Ennett, Bauman, Foshee, et al., 2001; Reimuller et al., 2011). Longer-term results on actual drinking may clarify the impact of this program component.

Far more clear is the evidence from longitudinal studies on the efficacy of quality of alcohol-specific communication and alcohol-specific rules in preventing early drinking (Koning, Van den Eijnden, Verdurmen, Engels, & Vollebergh, 2012; Van der Vorst et al., 2006; Yu, 2003). In accord, we observed these parenting behaviors to predict children's intention to drink. Still, in contrast to other studies (Koning et al., 2009; Kosterman, Hawkins, Haggerty, Spoth, & Redmond, 2001), program participation did not alter these factors. Possibly, an alternative sequence (e.g. handling rules earlier in the program) or alternative formats (e.g. video examples of good quality communication or feedback on communication and rule-setting) may improve their efficacy. Moreover, the ability of assessing improvement in quality of communication and alcohol-specific rules was impaired as baseline reports were very high and showed little variation at the age of 11 (mean (SD) are respectively 3.97 (.68) and 4.84 (.23) on a five point scale) (ceiling-effect). As parenting factors, like alcohol rules (Van der Vorst et al., 2005), show more variation when adolescents are older, parents

remaining high quality conversations and strict rules about alcohol might be important program successes which may not be ruled out on the longer-term.

In line with our hypothesis, the improved alcohol cognitions among the adolescents could be explained by program-targeted parenting factors, like alcohol-related conversations, yet only in part. In addition, the improved alcohol cognitions may be due to unmeasured program successes, like family bonding and adolescents' knowledge about drinking.

## Limitations

Some limitations need to be mentioned. First, our sample size is relatively small, resulting in little power to detect potential differences especially among subgroups. Still, the aim of this pilot RCT was to test the effects of the program on the proposed mediators and alcohol cognitions in children, for which we did not need a larger sample. Also, studying gender differences using a relatively small sample is suggested for meta-analytic purposes (Oesterle, Hawkins, Fagan, Abbott, & Catalano, 2010). Second, causal interpretation of the observed mediation effects should be made with caution, keeping in mind that even in an RCT randomization on the level of the mediators cannot be performed. Hence, mediators and outcomes may be confounded which could violate the assumption under which causality can be claimed (MacKinnon & MacKinnon, 2008). Third, long-term follow-up assessments are needed to investigate whether the intervention 1) delays adolescent actual drinking; 2) improves parenting factors with ceiling effects; and 3) is equally effective across gender. Fourth, replication of this study in other countries is warranted to ensure the generalizability of the present findings.

## Conclusion

This family-based program was the first theory-based home intervention aimed to prevent adolescent drinking among elementary school children in the Netherlands. This relatively inexpensive, easy-to-administer program was completed by mothers and children in their home environment at a time of their choice. This created the opportunity to reach a wide array of families and made the program easily accessible. In conclusion, the present study showed that due to the "In control: No alcohol!" program adolescents perceived alcohol to be more harmful and had less intention to drink, and these effects became stronger over time. Although results on actual drinking need to be added, these findings are promising. Among boys, part of the altered perception of the harm of drinking could be explained by having more alcohol-related conversations with their mothers. As parenting practices may influence early drinking differently across gender, more research is needed to probe into the mechanism through which family programs are effective in preventing early drinking across gender.



# Chapter 11

Effectiveness of the home-based  
alcohol prevention program  
"In control: No alcohol!":  
Study protocol of a randomized  
controlled trial



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## Abstract

In the Netherlands, children start to drink at an early age; of the Dutch 12-year olds, 40% reports lifetime alcohol use, while 9.7% reports last-month drinking. Starting to drink at an early age puts youth at risk of developing several alcohol-related problems later in life. Recently, a home-based prevention program called "In control: No alcohol!" was developed to delay the age of alcohol onset in children. The main aim of this project is to conduct a Randomized Controlled Trial (RCT) to evaluate the effectiveness of the program. The prevention program will be tested with an RCT among mothers and their 6 grade primary school children (11-12 years old), randomly assigned to the prevention or control condition. The program consists of five printed magazines and an activity book designed to improve parental alcohol-specific socialization. Parent-child dyads in the control group receive a factsheet information brochure, which is the standard alcohol brochure of the Trimbos Institute (the Netherlands Institute for Mental Health and Addiction). Outcome measures are initiation of alcohol use (have been drinking at least one glass of alcohol), alcohol-specific parenting, susceptibility to drinking alcohol, alcohol expectancies, self-efficacy, and frequency and intensity of child alcohol use. Questionnaires will be administered online on secured Internet webpages, with personal login codes for both mothers and children. Mothers and children in both the experimental and control condition will be surveyed at baseline and after 6, 12, and 18 months (follow-ups). The present study protocol presents the design of an RCT evaluating the effectiveness of the home-based "In control: No alcohol!" program for 6 grade primary school children (11-12 years old). It is hypothesized that children in the prevention condition will be less likely to have their first glass of alcohol, compared to the control condition. When the prevention appears to be effective, it can easily and relatively quickly be implemented as a standard alcohol prevention program on a large scale.

Trial registration: Nederlands Trial Register NTR2564

## Background

Adolescence is characterized by a strong increase in alcohol use: In 2009, approximately 40% of all Dutch 12-year olds reported lifetime alcohol use, which increases to 70% among 14-year olds and 85% among 16-year olds (Van Dorsselaer et al., 2010). Of the Dutch 12-year olds, 9.7% even reported to have been drinking in the last month (Van Dorsselaer et al., 2010). Starting to drink at an early age puts youth at serious risk of developing many alcohol-related problems, such as heavy episodic drinking, alcoholism, and cognitive impairments (e.g., Ellickson, Tucker, Klein, & McGuigan, 2001; Kuntsche, Van der Vorst, & Engels, 2009). These consequences of early onset of alcohol use stress the need to postpone the age of onset. Most school-based alcohol prevention in the Netherlands is conducted at the secondary educational level among 12-15-year olds, while at this age many children have already started to experiment with alcohol. Since many Dutch youth start to drink in early adolescence, prevention programs targeting elementary schoolchildren are needed. However, theory-driven alcohol prevention programs for elementary schoolchildren are lacking.

Socialization theory (Bandura, 1986) posits that parents are the main socializing agents in their children's development, especially when it comes to health issues, which has been supported by a wide range of studies (Lau et al., 1990; Tinsley, 1992). Recent studies in the Netherlands showed that through e.g., setting strict rules about alcohol, communicating constructively about alcohol issues, and monitoring daily activities, parents can delay the onset of alcohol use (Van der Vorst et al., 2005; 2006; 2007; 2009). Another reason why parents are important in preventing adolescent alcohol use is that elementary schoolchildren live at home and are still very susceptible to their parents' influences, while peers become more important during mid-adolescence and in some domains parental influence declines (Poelen et al., 2005; Van der Vorst et al., 2009). Moreover, most children get their first glass of alcohol from their parents (Verdurmen et al., 2008). By making parents aware of their role in introducing alcohol to their child, the age of alcohol onset can be delayed (e.g. Van der Vorst et al., 2007).

Parental drinking affects adolescent alcohol use through norm-setting and modeling (Duncan, Scherrer, et al., 2006; Van der Vorst et al., 2009). Further, drinking parents tend to engage less in alcohol-specific socialization practices (Latendresse et al., 2008; Van der Vorst et al., 2005), probably because they do not consider themselves being credible in prohibiting their children from drinking. However, alcohol-specific socialization strategies like setting rules, monitoring and communicating constructively are also effective when parents are (heavy) drinkers themselves (e.g., Koning et al., 2009; Van der Vorst et al., 2005). Therefore, it is important to empower this specific group of parents to enhance the confidence alcohol-drinking parents have in the effectiveness of their alcohol-specific parenting strategies. The current program addresses this issue by increasing parents' comfort level in communicating with their children about (their own) alcohol use.

Thus, although there is substantial empirical evidence that parents can prevent early onset of drinking by engaging in alcohol-specific parenting, no effective prevention program for parents and primary school children has been implemented in the Netherlands. The prevention program "In control: No alcohol!", which approach is based on a smoking prevention program called "Smoke-free Kids" (Hiemstra et al., 2009), aims to fill this gap. It is a home-based program, which provides many opportunities to engage in structured interactions for the parents and children. Parents and children can go through the program on their own, when they have time, and are not obliged to engage in a complex, time-consuming program. A pilot study conducted over a period of 6 months has provided some insight into the effective components of the "In control: No alcohol!" program (Mares, Van der Vorst et al., 2012). Specifically, exposure to the program increased the likelihood that mothers make a rule with their children about not drinking before a certain age, that mothers monitor their children, and for mothers that drink alcohol more than average, it increased the quality of alcohol-specific communication.

### Aim and hypotheses

The main aim of this project is to conduct a Randomized Controlled Trial (RCT) to evaluate a recently developed home-based alcohol prevention program, entitled "In control: No alcohol!" The program focuses on alcohol-specific parenting as a tool in delaying the age of alcohol onset in children. Onset of alcohol use is defined as the intake of the first glass of alcohol. With this RCT, including an experimental and a control group, we test whether fewer children have their first drink at an earlier age when included in the program. The second aim is to determine whether the program increases maternal use of several alcohol-specific parenting practices according to mothers and their offspring. The third aim is to test whether the prevention program differs between families varying on parental own drinking.

More specifically, we expect that a) a significant lower percentage of children who followed the program will have had their first glass of alcohol at the last follow-up compared to children who did not follow the program. b) mothers who followed the program are significantly more likely to engage in alcohol-specific parenting than mothers who did not follow the program. We expect that mothers involved in the program (as compared to controls) will set and keep stricter rules about alcohol, are more involved in constructive communication on alcohol-related topics, have more confidence in discussing alcohol matters, reduce children's access to alcohol beverages, make a rule with their children about not drinking before a certain age and are more likely to monitor children's activities. c) Above average drinking mothers that follow the program are more likely to increase their alcohol-specific parenting as compared to below average drinking mothers that follow the program.

## Method/Design

### Study Design

The prevention program "In control: No alcohol!" will be tested with an RCT with 2 conditions. A total of 656 mothers and their 6 grade children (11-12 years old) will be involved in the experimental group receiving the program, and 656 mothers and their children will participate in the control condition. Mother-child dyads in the control group receive a factsheet brochure on youth alcohol use and the detrimental consequences of alcohol use among children, which is the standard alcohol brochure of the Trimbos Institute (the Netherlands Institute for Mental Health and Addiction). The experimental group receives 5 modules on a monthly basis. After baseline assessment of children and mothers, follow-up assessments will be conducted after 6, 12, and 18 months (see Figure 1). Assessments will be conducted among both children and mothers at each time point.

At the end of the project, 10 travel checks of 500 euro's will be raffled between families who filled in the questionnaire at each time point. Children will receive a small gift to thank them for participating in the study.

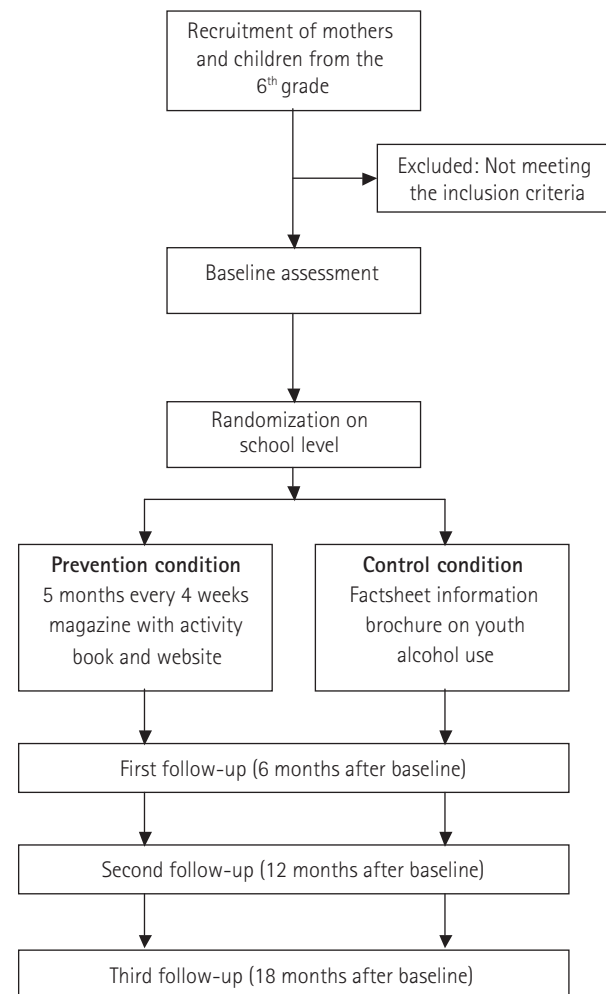
### Participants

**Recruitment.** Respondents will be recruited through a selected sample of primary schools in the Netherlands. Principals of participating primary schools are asked to hand out envelopes for the mothers to children from grade 6 of Dutch elementary school, who are 11-12 years old at the time the prevention starts. This envelop includes a letter in which we ask mothers to participate with their children in a study testing an alcohol prevention program, an informed consent form for themselves and their children, and a response envelop. If mothers and their children want to participate, they can return their contact information by means of the informed consent form in the enclosed response envelop. Also, mothers and children can read information about the study and register online via a webpage.

**Inclusion criteria.** To be included in the present study, children will have to be in grade 6 of Dutch elementary school, when most children are 11-12 years old. Children can only participate together with their mother or a female guardian, and they both have to be able to speak and read Dutch. The form with which mothers and children sign up for the study also serves as an informed consent form. The proposed study and prevention protocols have been approved by the ethical committee of the Faculty of Social Sciences at the Radboud University Nijmegen (ECG16092010).

We focus on grade 6 children (11-12 years old) at baseline, because children start to get increasingly interested in alcohol issues at this age (Dalton et al., 2005), but have generally not drunk their first glass of alcohol yet (Pieters et al., 2010), which makes them an important target group for primary prevention. Providing an alcohol prevention program just before

Figure 1 Study design.



the age of onset, might have a large impact on the health of these children (Van der Vorst et al., 2007). Inclusion of younger children might not be appropriate, because they will be less likely to consider drinking alcohol themselves. Thus, the period will be too long before they think of trying alcohol. Further, this age group consists of children who are in late childhood, prior to early adolescence. Early adolescence is characterized by increased conflicts with parents, especially with mothers (Granic, Hollenstein, Dishion, & Patterson, 2003) leading to less conformity and openness. This pleads for a focus on the developmental

period prior to early adolescence – late childhood – when children are expected to be still quite susceptible to the influence of their parents (Jackson & Dickinson, 2006). While Dutch prevalence figures indicate that 13 to 17% of the 11 years old children drank at least one glass of alcohol (Monshouwer et al., 2003; Pieters et al., 2010) and we expect this also to be the case in our sample at baseline, we expect that the prevention program "In control: No alcohol!" will significantly lower the increase of this percentage a year later.

We have a few reasons to focus on mothers as target parents: (a) most children spend more time with their mother than with their father, giving mothers the practical advantage of having more time to deliver the alcohol-specific socialization program to their children (www.cbs.nl), (b) if parents are divorced, in most cases children live with their mothers (www.cbs.nl), (c) women generally are more likely than men to enroll in health-related programs (Thurston & Phares, 2008), (d) the smoking-specific program also included only mothers, and (e) given the plausibility that program effects would differ by parent gender, including fathers would substantially increase the size and costs of the proposed trial. However, since fathers drink more alcohol than mothers (www.cbs.nl), we measure paternal drinking behaviors in the questionnaires of both mothers and children, to be able to control for paternal drinking in the analyses.

**Randomization.** Randomization will take place at the school level, to avoid contamination between conditions. This means that all children in one school will be allocated to the same condition, prevention or control. An independent statistician will perform the allocation of schools to the two conditions.

### Sample Size Calculation

Based on the outcomes of parent-adolescent interventions in the Netherlands and the United States (Jackson & Dickinson, 2006; Latendresse et al., 2008), we expect a minimal 10% difference in initiation rates between the control and experimental group at the third follow up, which is approximately 12 months after the end of the prevention. Equal cell sizes are assumed for study cells and power of .80 has been targeted. The primary hypothesis, a significant lower percentage of children who have their first glass of alcohol in the prevention group than in the control group, will be tested at an overall significance level of 0.05 (two-sided). G-Power was used to calculate the estimated sample sizes for two-sample comparison of proportions. Based on the prevalence of alcohol use in 13 year olds (age of the children at 18 months follow-up), which is 55%, we need 404 children per condition. However, if we take into account possible attrition (0.80), the fact that data are clustered (mother-child dyads are nested within schools) and the fact that we apply multiple imputation in the case of missing data (factor 1.4), we end up with 656 children per condition  $((183 / 0.80) * 1.4)$ . Thus, 1312 mothers (and children) are required to participate. In accordance with the intention-to-treat philosophy, all children randomized to one of the conditions are included in analyses to test the study hypotheses.

## Program

**Theoretical basis of the program.** The program was structured around two theories to meet the prevention objectives: Social Cognitive Theory and models of persuasive communication for attitude and behavior change. Fundamentals of child socialization were derived from Bandura's Social Cognitive Theory (Bandura, 1986) and consisted of perception (the articulated thoughts and actions of parents or other socializing agents are noticed by the child); cognitive rehearsal (recall and assignment of meaning to what has been noticed by the child); behavioral rehearsal (rehearsal of the things learned while receiving feedback regarding these thoughts and behaviors); and motivation (reinforcement for certain communications and actions). Every part of the program addresses one or more of these child socialization processes.

The Elaboration Likelihood Model (Petty & Cacioppo, 1986) contributed to the design of persuasive communication. This model states that participants can differ in the degree to which they experience the program being relevant or obvious. While designing the prevention content and layout, this should be taken into account. For example, some parents will respond to program recommendations most through message content while others' may be most affected by peripheral cues such as print design. Both content and layout are taken into account while structuring program information.

Other program design strategies which are theory-based and have been used to develop the alcohol-specific socialization program include: (a) allow participating parents to exercise choice regarding when and how to implement program objectives, which will increase the probability that for example alcohol using parents will participate, (b) begin with "small wins" that are easy to achieve and build parental confidence, and thereafter, promote gradual change in socialization activities, (c) dedicate part of the prevention to developing the requisite skills, such as parent-child communication skills, needed to implement other program recommendations, (e) build program recommendations on alcohol-specific socialization literature, and (d) use multiple reinforcers, including self-monitoring and feedback (and a small financial incentive at the end) to maintain involvement and motivation.

**Prevention condition.** The proposed program, "In control: No alcohol!", consists of 5 modules which families receive by mail every 4 weeks for a period of 5 months. A module consists of an attractive magazine including information, games, quizzes, and puzzles for parents and children to complete together. These structured interactions for the parent and child is a key technique for facilitating parent-child engagement in the program. The magazines' content is based on the empirical evidence of alcohol-specific parenting in the delay of early alcohol intake (e.g., Spijkerman et al., 2008; Van der Vorst et al., 2005; 2007; 2009).

Each of the five magazines addresses different important issues regarding youth alcohol use and child socialization. Magazine 1 consists of general information about alcohol, alcohol use among children and the importance of parenting behavior, such as

anti-alcohol norms and parental supervision. Magazine 2 addresses the risks of alcohol use, especially among children, and parental attitudes towards early drinking. Magazine 3 focuses on parental modeling of alcohol use and the effectiveness of setting rules about alcohol, also for parents who use alcohol themselves. Magazine 4 aims at enhancing awareness about peer influence and increasing the ability to handle peer pressure, while magazine 5 discusses the influence of alcohol-related media and again stressed the eminence of setting clear and strict rules. In addition to these specific topics, each magazine contains general information and practical tips on high-quality parent-child communication in order to gradually increase parents' skill and comfort level in communicating with their children about alcohol.

In addition, with the first magazine the child receives a personalized activity book ("Logboek"). The activity book provides the child the opportunity to repeat what he/she learned about alcohol in a playful and personal way. It is also an extra stimulus to be active in the program. With the activity book, each child receives a personal login code for the related secured website ([www.houvolgeenalcohol.nl](http://www.houvolgeenalcohol.nl)). The login code provides access to more games, puzzles and pictures related to the prevention program. The child can download the completed website activities and put them in his/her activity book, so he/she can create his/her own glossy journal.

**Control condition.** Mother-child dyads in the control group receive a factsheet information brochure on youth alcohol use and the detrimental consequences of alcohol use among children, which is the standard alcohol brochure of the Trimbos Institute. Providing a brochure for controls was done primarily to establish a plausible explanation regarding the need for the post-treatment survey for participants in the control condition. The brochure will give them the idea that they are participating in an alcohol prevention study. We choose for this brochure, because it is already available for all Dutch parents, and can be found in several health institutions. It is easily accessible for parents who have an interest in youth alcohol use, so basically many Dutch parents were already exposed to this type of prevention. Although this information could increase mothers' knowledge regarding alcohol issues, this knowledge is not expected to have an effect on alcohol-specific socialization processes or on children's susceptibility to or initiation of alcohol use, since it will not include any tools for mothers on how to use alcohol-specific parenting.

## Data Collection

Both mothers and children will receive separate personal login codes by email. With these login codes they have access to their own baseline questionnaire on a secured webpage. In the case a mother or child prefers a paper questionnaire, this will be sent to their home. Mothers and children are explicitly asked to fill in the questionnaires separately. This questionnaire procedure will take place at each assessment. Non-responding mothers or children will be approached by phone to motivate them to fill in the questionnaire. Mothers and children in both the experimental and control condition will be assessed at



baseline (1 month before prevention starts), after 6 months (first follow up), after 12 months (second follow-up) and after 18 months (third follow up). An overview of all measures at each time point is provided in Table 1.

**Outcomes.** The primary outcome, initiation of alcohol use, is defined as have been drinking at least one glass of alcohol. Secondary outcome measures are alcohol-specific parenting dimensions such as rules about alcohol, non-drinking agreement, alcohol availability at home, and frequency and quality of alcohol-specific communication (e.g., Spijkerman et al., 2008; Van der Vorst et al., 2005), but also general parental monitoring (Kerr & Stattin, 2000) and parent-child relationship quality (Furman, & Buhrmester, 1985). Other outcomes are susceptibility to drinking alcohol, defined as the lack of a firm commitment against drinking alcohol (Elder et al., 2002; Pierce, Choi, Gilpin, Farkas, & Merritt, 1996), alcohol expectancies (Dunn & Goldman, 1996), self-efficacy (De Vries et al., 1988; Engels, Wiers et al., 2005), and frequency and intensity of child alcohol use (Engels & Knibbe, 2000). The Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997) will be used as a behavioral screening instrument for early detection of psychological problems. Psychological problems are associated with problem behaviors like drinking alcohol at an early age (e.g., (Connor et al., 2011).

**Statistical analyses.** In accordance with the intent-to-treat philosophy, all children randomized to a condition will be included in the analyses to test the study hypotheses. Moreover, while randomization takes place on school level and children are 'nested' within these schools, we need to control for clustered data (Muthén & Muthén, 1998-2010). Mplus is a statistical modeling program that has special features to deal with missing data and it allows analyses with complex data while taking into consideration the longitudinal character of the data and the fact that data are clustered. Regression analyses for dichotomous outcome measures (logistic regression) will be conducted to test whether children in the control condition are more likely to initiate drinking than children in the experimental condition (Latendresse et al., 2008; Muthén & Muthén, 1998-2010). For the second aim of our study, namely, that mothers in the prevention group will use more alcohol-specific socialization strategies than mothers of the control group, we will perform mediation analyses in Mplus, using the bootstrap method (Muthén & Muthén, 1998-2010). To test our third hypothesis of the study, possible moderating effects of relevant demographic indices such as gender, as well as mothers' alcohol use at baseline, we will create products of the predictors and then include those interaction terms in the logistic regression model (e.g., condition \* mothers' drinking; (Muthén & Muthén, 1998-2010).

**Table 1** Overview of measures

Measure	Baseline		Follow-up 1		Follow-up 2		Follow-up 3	
	Mother	Child	Mother	Child	Mother	Child	Mother	Child
Demographic characteristics	X	X						
Monitoring	X	X	X	X	X	X	X	X
Parent-child relationship (NRI)		X		X		X		X
Intention to drink alcohol		X		X		X		X
Self-efficacy		X		X		X		X
Drinking norms		X		X		X		X
Alcohol use parents	X	X	X	X	X	X	X	X
Problem drinking parents	X		X		X		X	
Alcohol use child	X	X	X	X	X	X	X	X
Alcohol use peers & siblings		X		X		X		X
Attitude about alcohol	X	X	X	X	X	X	X	X
Alcohol-related consequences	X	X	X	X	X	X	X	X
Anti alcohol socialization								
Availability of alcohol at home	X	X	X	X	X	X	X	X
Rules on alcohol	X	X	X	X	X	X	X	X
Communication about alcohol	X	X	X	X	X	X	X	X
Parental norms	X		X		X		X	
Parental influence on offspring alcohol use	X		X		X		X	
Strengths and Difficulties Questionnaire (SDQ)	X	X	X	X	X	X	X	X
Program evaluation/ utilization			X	X				

## Discussion

The present study protocol presents the design of an RCT evaluating the effectiveness of the "In control: No alcohol!" program for 6 grade children. This universal prevention program aims to delay the age of alcohol onset for Dutch children. It is hypothesized that



mothers in the prevention condition will employ more alcohol socialization practices, and that children in the prevention condition will be less likely to have their first glass of alcohol, compared to the control condition.

### Strengths and limitations

An important strength of the program "In control: No alcohol!" is that it is theory driven. The underlying structure of the program is based on the Social Cognitive Learning Theory (Bandura, 1986), and the Elaboration Likelihood Model (Petty & Cacioppo, 1986), while the content is based on recent alcohol-specific parenting research (Spijkerman et al., 2008; Van der Vorst et al., 2005; 2006; 2007; 2009). Second, the program reaches children during the pre-initiation stage of alcohol use, aiming to prevent them from drinking their first alcoholic beverage, and thereby lowering the odds of heavy drinking (Ellickson et al., 2001; Kuntsche et al., 2009). Third, parents can complete the program with their children at home at a time of their choice. This creates the opportunity to include parents in the study, who are normally more difficult to reach for alcohol prevention, like parents who drink alcohol.

A strength of the study design is that it also includes long-term follow-ups at 12 and 18 months, in addition to the immediate follow-up at 6 months. This will create more opportunity to find an effect on actual alcohol use of the children, as well as mediating effects through alcohol-specific parenting practices. Further, if the "In control: No alcohol!" program turns out to be effective, it can easily be implemented on a large scale via primary schools. A limitation of the study is that only mothers can participate. While there are several good reasons for this choice (e.g. mothers are more likely to spend time with their children and to enroll in health-related programs), previous research has shown differences in alcohol-specific socialization between mothers and fathers; For example, mothers communicate more often about alcohol (Van der Vorst et al., 2005; Van der Vorst, Burk et al., 2010) and are more understanding towards their children (Noller & Callan, 1990) compared to fathers. In future research, the effect of the program, when targeted at fathers, should be investigated.

### Implications for practice

If the "In control: No alcohol!" program turns out to be effective, it can be implemented on a large scale in a reasonable amount of time. The program's modular, self-help format allows flexibility as regards where, when, and how it is implemented. Although the proposed study will measure effects on individual children after delivering the modules to households, in the future, the program could also be self-administered on a website that provides sequential access to the prevention modules. This is one of the main reasons that the Trimbos Institute (the Netherlands Institute for Mental Health and Addiction) is actively involved in this project. Collaboration with the Trimbos Institute guarantees that the program will be widespread and will reach large populations. Another advantage of the

close collaboration with Trimbos Institute is that the results of this study can be transferred to practice immediately hardly without delay.

### Conclusion

This study will evaluate a protocol for preventing early alcohol onset in children. The results of this study will provide insights into the effectiveness of the "In control: No alcohol!" prevention program and the antecedents of alcohol use among children.

## Chapter 12

In control: No alcohol!: Outcomes of a randomized Controlled Trial of a Home-Based Alcohol Prevention Program for Children and their Parents



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*Manuscript under review.*

## Abstract

The aim of this study was to evaluate the effectiveness of a recently developed home-based alcohol prevention program to delay age of alcohol onset in children. We used a cluster randomized controlled trial with two conditions; (1) intervention group (5 modules which families received by mail every 4 weeks over 5 months) (N = 680), (2) control group (a factsheet information brochure) (N = 669). An independent statistician allocated the schools to the conditions (allocation ratio (1:1)). Participants and data-analyst were blind to randomization. Primary schools in the northern part of the Netherlands were approached to recruit participants. Participants were a total of 1349 sixth-grade children (mean age = 12.15, standard deviation = 0.47) and their mothers who were able to read and write Dutch. The primary outcome was alcohol initiation (i.e., drinking a glass of alcohol). Analysis focused on intention-to-treat. In 2011, 1,349 children and their mothers enrolled into the study: 680 in the intervention and 669 in the control condition. In the intervention condition (N = 540) 5.4% of the children drank a glass of alcohol compared to 7.1% in the control condition (N = 601). The difference between the two conditions was not significant (odds ratio = .99, 95% confidence interval = .96-1.02,  $p = .52$ ). No moderating effects of child gender, maternal alcohol use (frequency and intensity) or alcohol-related problems were found. The present study showed no effects of 'In control: No alcohol!' on alcohol initiation. A critical evaluation of program design and content, and future studies in different target groups are suggested.

## Introduction

Alcohol use has been attributed to significant health, social, and economic problems worldwide, with adolescents being more vulnerable to the negative effects of alcohol use compared to adults (World Health Organization, 2007). The Netherlands is among the European countries with the highest percentage of alcohol-using adolescents and in which adolescents drink the highest amounts of alcohol (Hibell et al., 2009). At the age of 12, 35% of the Dutch adolescents have at least tasted alcohol (Verdurmen, Monshouwer, et al., 2012). Prevention of alcohol use among elementary school children is therefore important, particularly because delaying the consumption of the first glass of alcohol results in a lower risk of several alcohol-related problems, such as alcohol abuse or dependence, in adulthood (Behrendt et al., 2009; Englund et al., 2008). However, most alcohol prevention in the Netherlands takes place during secondary school years (Koning et al., 2009). Since Dutch adolescents start drinking around the age of 12, the recently developed "In control! No alcohol" prevention program is targeted at elementary school children (11-12 years old) and their parents and is mainly based on socialization and communication theories (Bandura, 1986; Petty & Cacioppo, 1986). In the present study, the effect of the program on initiation of alcohol use was evaluated using a randomized controlled design.

Socialization theory posits that parents are the main socializing agents in their children's development, especially when it comes to health issues, which has been supported by a wide range of studies (Lau et al., 1990; Tinsley, 1992). Recent studies in the Netherlands showed that through e.g., setting strict rules about alcohol, communicating constructively about alcohol issues, and monitoring daily activities, parents can delay the onset of alcohol use (Koning et al., 2012; Spijkerman et al., 2008; Van der Vorst et al., 2007). Another reason why parents are important in preventing adolescent alcohol use is that elementary schoolchildren live at home and are still very susceptible to their parents' influences, while peers become more important during mid-adolescence when parental influence in some domains declines (Duncan et al., 1995; Van der Vorst et al., 2009). Moreover, most children get their first glass of alcohol from their parents (Verdurmen et al., 2008). By making parents aware of their role in introducing alcohol to their child, the age of alcohol onset can be delayed (e.g. Van der Vorst et al., 2007). Therefore, informing parents about the strategies they can use to prevent their children from drinking alcohol and empowering them to effectively use these strategies is an important avenue for prevention of children's alcohol use.

Parental drinking is an important precursor of adolescent alcohol use through norm-setting and modeling (Duncan, Duncan, et al., 2006; Yu, 2003). At the same time, drinking parents tend to engage less in alcohol-specific socialization practices (Latendresse et al., 2009; Tildesley & Andrews, 2008; Van der Vorst et al., 2005). This is probably because they do not consider themselves being credible in prohibiting their children from drinking. Yet, alcohol-specific socialization strategies like setting rules, monitoring and communicating constructively are also effective when parents are (heavy) drinkers themselves (e.g. Koning

et al., 2009; Van der Vorst et al., 2005). Since children of (heavy) drinking parents can be considered a high-risk group, it is important to empower in particular this specific group of parents to enhance the confidence alcohol-drinking parents have in the effectiveness of their alcohol-specific parenting strategies. The current program addresses this issue by increasing parents' comfort level in communicating with their children about (their own) alcohol use.

Although there is substantial empirical evidence that parents can prevent early onset of drinking by engaging in alcohol-specific parenting, no effective prevention program for parents and primary school children has been implemented in the Netherlands. The prevention program "In control: No alcohol!", which approach is based on a smoking prevention program called "Smoke-free Kids" (Hiemstra et al., 2009; Jackson & Dickinson, 2006), aims to fill this gap. It is a home-based program, which provides many opportunities to engage in structured interactions for the parents and children. Parents and children can go through the program on their own, when they have time, and are not obliged to engage in a complex, time-consuming program. A pilot study conducted over a period of 6 months has provided some insight into the effective components of the "In control: No alcohol!" program (Mares, Van der Vorst et al., 2012). Specifically, exposure to the program increased the likelihood that mothers make a rule with their children about not drinking before a certain age, that mothers monitor their children, and for mothers that drink alcohol more than average, it increased the quality of alcohol-specific communication.

The main aim of this study was to conduct a Randomized Controlled Trial (RCT) to evaluate a recently developed home-based alcohol prevention program, entitled "In control: No alcohol!". The program focused on alcohol-specific parenting as a tool in delaying the age of alcohol onset in children. We expected that a significant lower percentage of children who followed the program would have had their first glass of alcohol at the last follow-up compared to children who did not follow the program. Further, we expected that the effect of the program would be stronger when alcohol use of mothers was higher or when mothers reported more alcohol-related problems. We also examined whether the program effect would differ between boys and girls, because of the gender differences in alcohol use patterns (Verdurmen, Monshouwer, et al., 2012).

## Method

### Procedure

The prevention program "In control: No alcohol!" was tested with a two-arm, parallel-group RCT (see Mares, Van der Vorst, Lichtwarck-Aschoff, et al. (2011) for a protocol of this study). A selected sample of primary schools in the northern part of the Netherlands was asked to hand out envelopes for the mothers to children from grade 6 of Dutch elementary schools including an information letter and an informed consent form for

themselves and their children. A total of 1,393 parents and their children gave their informed consent by returning the signed response letter (Figure 1). Of these, 1349 fulfilled the eligibility criteria: a) being able to read and write Dutch, b) the child being in sixth grade, c) the adult being the mother or female guardian of the child, and took part in the baseline survey. Both mothers and children received separate personal login codes by email. With these login codes they had access to their own baseline questionnaire on a secured webpage. They could complete the questionnaires at home. Non-responding mothers or children were approached by phone to motivate them to fill in the questionnaire. Mothers and children in both the experimental and control condition were assessed at baseline in April/May 2011 (1 month before prevention starts), after 6 months (first follow up), after 12 months (second follow-up) and after 18 months (third follow up). When children still participated at third follow up, they received a € 5,- cinema voucher. At the end of the project, 10 travel checks of € 500,- were raffled between families that filled in the questionnaire at each time point.

### Sample Size

A power calculation indicated that to detect a 10% difference between the control and intervention condition in alcohol use among 13 to 14 year old adolescents (i.e., 18-month follow-up) using a two-tailed test with  $\alpha = .05$  and power  $(1-\beta) = .80$ , 404 children were needed per condition. To take into account attrition, data clustering and imputations in case of missing data we included a minimum of 656 children and mothers per condition to detect significant differences in alcohol use.

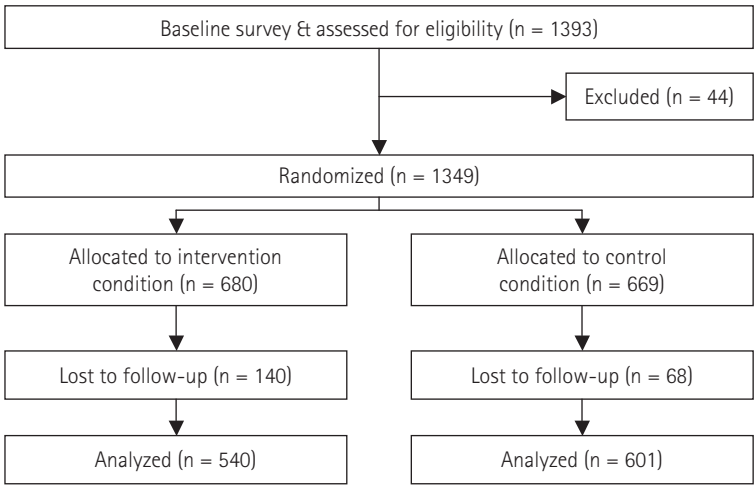
### Randomization

Directly after baseline, an independent statistician allocated the participants to the two conditions according to a computer-generated randomization list following simple randomization procedures (allocation ratio (1:1)). To avoid contamination between conditions, randomization took place at the school level. Participants and data-analyst were blind to randomization.

### Interventions

**Intervention condition.** The proposed program, "In control: No alcohol!", consisted of 5 modules which families received by mail every 4 weeks for a period of 5 months, starting in May/June 2011. A module consisted of an attractive magazine including information, games, quizzes, and puzzles for parents and children to complete together. These structured interactions for the parent and child were a key technique for facilitating parent-child engagement in the program. The magazines' content was based on the empirical evidence of alcohol-specific parenting in the delay of early alcohol intake (e.g. Spijkerman et al., 2008; Van der Vorst et al., 2005; 2007; 2009). In addition to magazine-specific topics, each magazine contained general information and practical tips on high-quality parent-child

Figure 1 Flow of participants through the trial.



Note. Numbers analyzed may differ for some analyses since some participants had missings on individual variables.

communication in order to gradually increase parents' skill and comfort level in communicating with their children about alcohol. In addition, with the first magazine the child received a personalized activity book ("Logboek") to provide the child the opportunity to repeat what he/she learned about alcohol in a playful and personal way. With the activity book, each child received a personal login code for the related secured website ([www.hou-volgeenalcohol.nl](http://www.hou-volgeenalcohol.nl)). The login code provided access to more games, puzzles and pictures related to the prevention program. More detailed information on the program can be found in the study protocol (Mares, Van der Vorst, Lichtwarck-Aschoff, et al., 2011).

**Control condition.** Mother-child dyads in the control group received a factsheet information brochure in July/August 2011 on youth alcohol use and the detrimental consequences of alcohol use among children. This was the standard alcohol brochure of the Trimbos Institute. We choose this brochure, because it is already available for all Dutch parents, and can be found in several health institutions. Although this information could increase mothers' knowledge regarding alcohol issues, this knowledge was not expected to have an effect on alcohol-specific socialization processes or on children's susceptibility to or initiation of alcohol use, since it did not include any tools for mothers on how to use alcohol-specific parenting.

Outcomes

**Alcohol initiation.** of the child was measured at baseline and at third follow-up by asking the child whether he or she has ever drunk alcohol. Response categories were 1 = *No*, never, 2 = *Yes, one sip*, 3 = *Yes, multiple sips*, 4 = *Yes, one glass*, and 5 = *Yes, multiple glasses*. For the primary outcome, the scale was recoded into 0 = has not initiated drinking and 1 = has initiated drinking (*at least one glass*). Since alcohol initiation numbers for the total group were low compared to the numbers we expected based on alcohol initiation numbers in the general population, we also analyzed a post-hoc outcome measure. For this measure, the scale was recoded into 0 = has not initiated drinking and 1 = has initiated drinking (*at least one sip*).

**Maternal alcohol use.** was measured at baseline by asking mothers to report on the frequency of their own alcohol use in the past four week with one item, responses ranging from 1 = *have not been drinking* to 6 = *every day* (Engels & Knibbe, 2000). Intensity of alcohol use during the previous week was assessed by asking about the number of alcoholic beverages drank during weekdays and weekend, both home and outside the home (Engels et al., 1999). Sum scores of these four items indicated the total number of alcoholic drinks consumed in a week.

**Maternal alcohol-related problems.** were measured at baseline using a short version of the severity of problem drinking scale (Cornel et al., 1994). A previous study showed the short scale to be a valid alternative to the total scale (Bot et al., 2005). Response categories on the six items ranged from 1 = *never* to 5 = *always*, of which mean scores were computed, with a higher score reflecting more problems due to drinking alcohol. Some examples of items are: "Have you ever tried to quit drinking without being successful?" and "Did your partner or close relatives ever worry about your alcohol consumption, or complain about it?"

Strategy of Analysis

First, background and outcome variables were compared per condition to check whether randomization produced an even distribution of important characteristics of mothers and children across conditions. Logistic attrition analysis was performed to check whether mothers and children who completed the third follow-up measurement differed compared to mothers and children that dropped out.

Analyses of program effects were performed according to the intention-to-treat (N = 1,349) and the completers-only framework (N = 1,141). For the intention-to-treat analysis, missing values were imputed with multiple imputations in SPSS, while using alcohol use and alcohol-related problem reports of mothers and alcohol use reports of children at several waves as predictors. The predictive mean matching method (a variant of linear regression that matches imputed values computed by regression model to the closest observed value) was used to impute continuous variables and logistic regression was used for categorical variables.

Finally, to examine the effect of the program on alcohol initiation – the primary as well as the post-hoc outcome – Structural Equation Models models were conducted with MPLUS version 6.0 (Muthén & Muthén, 1998-2010). Outcome measures at baseline were added to the models as a covariate because adding strong predictors of the dependent variable can increase reduction in the error of the model, which can subsequently increase statistical power (Maxwell & Delaney, 2004). Through adding interaction terms, we examined whether child gender, maternal alcohol use (frequency and intensity) or alcohol-related problems moderated the relation between the program and the outcome measures. In all the SEM models, we accounted for non-independence of observations due to cluster sampling (Muthén & Muthén, 1998-2010). For the intention-to-treat analyses, the results of the 20 imputed datasets were combined by averaging the effects. Since all models were saturated (perfect fit), goodness-of-fit statistics were not reported.

## Results

As can be seen in Figure 1, after recruitment 1,393 received the baseline survey and were assessed for eligibility. Of these, 20 families failed to complete the baseline survey, 4 families did not fulfill the eligibility criteria, and 20 families cancelled their participation.

Eventually, 680 families were randomized into the intervention condition and 669 families were randomized into the control condition. To assess implementation integrity of the program, children completed participation records at 6-month follow-up. Of the families participating in the intervention, 66.5% of the children and 62.7% of the mothers read at least 3 of 5 activity modules. On a 10-point scale, children rated the program with a mean of 6.9 when asked how informative the program was. When asked to provide a grade for the program, mothers rated it with a mean of 7.2

The retention rates were high, with 1,191 mothers (88.3%) and 1,049 children (77.8%) completing the first, 1,067 mothers (79.1%) and 965 children (71.5%) the second, and 1,135 mothers (84.1%) and 1,113 children (82.5%) the third follow-up at 18 months after baseline.

Logistic regression showed that that families in the control condition were less likely to drop out compared to children in the experimental condition ( $OR = .39$ , 95%  $CI = .28 - .55$ ,  $p < .001$ ). Families that dropped out did not differ from families that completed the last wave on child gender, child alcohol use at baseline, and ethnicity and alcohol use of the mother.

As can be seen in Table 1, children in the control condition had a higher baseline rate of alcohol initiation (glass) compared to children in the experimental condition. When testing intervention effects, alcohol initiation at baseline was added to the model as a covariate. As can be seen in Table 2, no significant effects of condition were found for alcohol initiation. Further, no moderation effects of child gender, maternal alcohol use (frequency and

**Table 1** Baseline characteristics

	Control (N = 680)		Experimental (N = 669)		Total (N = 1349)	Significant difference I and C*
Age child (mean (SD))	12.14	(.47)	12.15	(.46)	12.15 (.47)	n.s.
Female sex (%)	49.8		48.1		48.9	n.s.
Dutch ethnicity mother (%)	97.2		97.1		97.1	n.s.
Weekly alcohol use mother (mean (SD))	3.38	(4.48)	3.73	(4.97)	3.55 (4.73)	n.s.
Alcohol initiation (glass) child (%)	3.5		1.2		2.4	$p = .006$
Alcohol initiation (sip) child (%)	47.7		49.5		48.6	n.s.

Note: n.s. =  $p > .05$ . \* Logistic regression analyses were used to compare the intervention with the control condition.



intensity) or alcohol-related problems on the relation between the program and the outcome measures were found.

**Table 2** Logistic regression analyses of the program effect on alcohol initiation

	Control (%)	Experimental (%)	OR	95% CI	p
Intention-to-treat					
Alcohol initiation (glass)			1.00	.97 – 1.05	.75
Alcohol initiation (sip)			.98	.93 – 1.03	.43
Completers only					
Alcohol initiation (glass)	7.1	5.4	.99	.96 – 1.02	.52
Alcohol initiation (sip)	57.0	55.6	.98	.93 – 1.03	.35

Note. Condition: 0 = control condition and 1 = intervention condition, OR = Odds Ratio, CI = Confidence Interval.

Discussion

In the present study, a cluster randomized controlled trial was conducted to examine whether the alcohol prevention program 'In control: No alcohol!' had an effect on alcohol initiation rates 12 months after completing the program. Contrary to the hypotheses, when the intervention and control condition were compared, the results showed that there were no significant effects of the program on alcohol initiation rates of children. This lack of effects did not differ between boys and girls, or between families in which mothers reported more compared to less alcohol use (frequency and intensity) or alcohol-related problems. Exploratory analyses with alcohol initiation defined as having been drinking at least one sip of alcohol instead of one glass of alcohol also showed a lack of program effects, even when confounders were added. These results show that, in the present study, the 'In control: No alcohol program' has not shown to be an effective program in preventing children from drinking alcohol.

Based on the fact that the program was theory-based and well-received by families, and that a previous pilot study showed positive preliminary effects of the program on parenting behaviors such as monitoring and quality of alcohol-specific communication (Mares, Van der Vorst, et al., 2012), we expected to find positive effects on child alcohol initiation as well. There are several possible reasons for this lack of program effect in the present study, one of them being that perhaps universal, home-based alcohol prevention

programs such as this one are not effective in preventing children from drinking alcohol. In general, a recent systematic review on universal alcohol prevention programs was not able to testify for the overall effectiveness of universal alcohol prevention programs, with a few exceptions (Foxcroft & Tsertsvadze, 2012). Further, those substance use prevention programs that do find positive effects, often only find these effects in high-risk subgroups (e.g. Jackson & Dickinson, 2006; Mares, Van der Vorst, et al., 2012; Koning, 2011). This could be an indication that selective prevention would be a more fruitful strategy in lowering young adolescent alcohol use. Although evidence on selective prevention is sparse, and it is difficult to draw firm conclusions (Bröning et al., 2012), there is some indication that targeting high-risk youth may indeed yield stronger effects than targeting the general population (Gottfredson & Wilson, 2003). Adding to this, mothers and their children could voluntarily sign up to participate in the present program. This has probably resulted in a low-risk sample, which is supported by the mean number of alcoholic drinks a week for women, which is 4.2 in the general Dutch population (www.cbs.nl), and 3.5 for women in the current study. In light of the findings discussed above, the voluntary nature – and as a consequence the low-risk sample – of the 'In control: No alcohol!' program would probably further limit the effectiveness. In future studies and during eventual implementation of such programs, an active effort should be made to include the at-risk population.

A second reason for the lack of program effects in the present study could be found in the specific context of this study. During the last decade, a shift in the Dutch drinking culture has been taking place. There has been increased attention for and awareness of the risks of alcohol use in young adolescents (Verdurmen, Vermeulen-Smit, Van Dorsselaer, Monshouwer, & Schulten, 2012). Increasing the legal drinking age and strict enforcement of drinking laws has been a topic of regular societal discussion in Dutch society and is also supported by the government. During this period, parental alcohol-specific rules have become more strict (Verdurmen, Vermeulen-Smit et al., 2012), and lifetime- as well as current alcohol use in especially young adolescents has decreased (Verdurmen, Monshouwer et al., 2012). The same message that was communicated through the program – that alcohol use is risky for young children and that parents should set strict rules – was communicated to the entire Dutch population through governmental campaigns at the exact time during which the study was conducted. In this changing context, the intended young target group and strictness message that seemed theoretically appropriate while developing the 'In control: No alcohol!' program might have been caught up by reality, which might have eliminated the possibility for finding program effects. If the program is to be effective, it should be adjusted to these changes, meaning that an older target group and a more conservative alcohol norm might be more appropriate in order to distinguish it from mainstream governmental policies – and make effects visible.

Strengths of the current study included a large sample size, the long-term follow-up and low attrition rates. In addition, the program is grounded in theory and has shown positive preliminary effects on parenting behaviors in a pilot study (Mares, Van der Vorst et

al., 2012). However, some limitations should be mentioned. Due to several reasons (see Mares, Van der Vorst, Lichtwarck-Aschoff, et al. (2011), this study only included mothers. Future research should also focus on fathers, especially since father-child communication on alcohol tends to occur less often (Van der Vorst et al., 2005) and fathers show less understanding towards their children (Noller & Callan, 1990). Therefore, one could expect fathers to benefit more from the program. Further, data were collected through self-reports, which might have been disadvantageous in two ways. First, participants might have provided socially desirable responses. Second, and probably more problematic, is the fact that reporting on one's alcohol use patterns could be considered prevention in itself (McCambridge, & Kypri, 2011). Since we asked participants to report on their alcohol use and other alcohol-related items every 6 months, it could be argued that this has prevented adolescents from initiating alcohol use. In this light it might have been difficult to assess whether the program had an additional effect over and above the reporting effect. Perhaps, future studies should limit the amount of times alcohol use among participants is assessed, or explore other ways of assessing alcohol initiation among children (e.g. proxy reports).

In conclusion, the present study showed no main program effects of 'In control: No alcohol!' on alcohol initiation, nor did it show subgroup effects for gender and maternal drinking. Taking into account the overall limited findings of universal early alcohol prevention and the changing context in which the program was tested, a critical evaluation of program design and content, and future studies in different target groups (age as well as risk status) are suggested.

## Appendix



## Research Question

A Randomized Controlled Trial (RCT) was conducted to evaluate a recently developed home-based alcohol prevention program, entitled "In control: No alcohol!". The program focused on alcohol-specific parenting as a tool in delaying the age of alcohol onset in children. While findings in chapter 12 showed no effects on children's alcohol initiation, the aim of the current additional analyses was to examine whether there were any differences between the control and experimental group on several important alcohol-specific parenting practices (alcohol-specific rules and quality of alcohol-specific communication) and children's alcohol-related cognitions (drinking refusal self-efficacy, alcohol expectancies, and intention to drink). Further, we examined whether these program effects would be moderated by child gender, parent educational level (SES), frequency (AFM) and intensity (AIM) of maternal alcohol use, and maternal alcohol-related problems (APM).

## Method

### Participants and Procedures

A full description of the study design can be found in the study protocol (Mares, Van der Vorst, Lichtwarck-Aschoff, et al., 2011). For an elaborate description of the sample characteristics, we refer to Chapter 12 of this thesis.

### Measures

**Alcohol-specific rules.** A 10-item scale (Van der Vorst et al. 2005) was adjusted for elementary school children (resulting in 11 items) and used to assess children's view on parental alcohol-specific rule-setting. Example items are "are you allowed to drink a nip of alcohol in the absence of your parents?", "...a glas of alcohol in the presence of your parents?", and "...at a party with friends?", with response categories ranging from 1 = *definitely not* to 5 = *definitely*. Responses were reverse scored so that a higher mean on this scale reflects more restrictive alcohol-specific rules. Alphas were .82 for the first wave, .87 for the second wave and .85 for the third wave.

**Quality of alcohol-specific communication.** Children were asked about the quality of maternal communication about alcohol with six items, such as "My mother and I are interested in each other's opinion about alcohol", "My mother and I talk easily about our opinions regarding drinking" and "If we are talking about alcohol use, my mother takes me seriously" (Spijkerman et al. 2008). Response categories ranged from 1 = *completely untrue* to 5 = *completely true*, of which mean scores were computed. A high mean on this score reflected a high quality of parental communication about alcohol. Alphas were .74 for the first wave, .78 for the second wave and .80 for the third wave.

**Self-efficacy.** Children's ability to refrain from drinking in differing situations was measured with six items on a six point Likert scale ranging from 1 = *very difficult* to 6 = *very easy* (De Vries, 1988; Engels, Wiers et al., 2005). A higher score on items like "To think of a reason to say no to a glass of alcohol is..." indicated higher self-efficacy to refrain from drinking. Alphas were .86 for the first wave, .89 for the second wave and .89 for the third wave.

**Alcohol expectancies.** To measure alcohol expectancies, the negative and positive subscales of the adjusted Dutch translation of the Alcohol Expectancies Scale for Children (Dunn & Goldman, 1996) were used. Adolescents were asked whether they think adults become for example friendly or mean when they drink alcohol, with response categories ranging from 1 = *never* to 4 = *always*. An exploratory factor analysis confirmed a positive and negative expectancies subscale. Alphas for the positive subscale were .84 for the first wave, .87 for the second wave and .87 for the third wave. Alphas for the negative subscale were .89 for the first wave, .91 for the second wave and .90 for the third wave.

**Intention to drink.** A single question was used to ask the adolescents whether they ever intended to drink alcohol. Response categories were 1 = *No, positively not*, 2 = *No, I think I will never start drinking*, 3 = *Yes, I think I will start drinking somewhere in the future*, 4 = *Yes, I think I will start dinking within 5 years*, 5 = *Yes, I think I will start drinking within 1 year*, 6 = *Yes, I think I will start drinking within 6 months*, 7 = *Yes, I think I will start drinking within 1 month*, 8 = *I already drink alcohol*.

**Maternal alcohol use.** At baseline, parents were asked about the frequency of their alcohol use in the past four weeks with one item. The response categories ranged from 1 = *have not been drinking* to 6 = *every day* (Engels & Knibbe, 2000). Intensity of drinking was assessed by asking the parents about the number of alcoholic beverages they drank in the previous week. This scale contains 4 items, targeted on alcohol use during weekdays and weekend, both home and outside the home (Engels et al., 1999). Of these four items, sum scores were used as an indication of the total number of alcoholic drinks consumed in a week.

**Maternal alcohol-related problems.** The degree of problems experienced by the mother due to alcohol consumption was measured at baseline with a short version of the severity of problem drinking scale (Cornel et al., 1994). Response categories on the six items ranged from 1 = *never* to 5 = *always*, of which mean scores were computed, with a higher score reflecting more problems due to drinking alcohol. Some examples of items are: "Have you ever tried to quit drinking without being successful?" and "Did your partner or close relatives ever worry about your alcohol consumption, or complain about it?" The alpha was .54.

### Strategy of Analyses

Latent Growth Curve modelling (LGC) in Mplus 6.0 (Muthén & Muthén, 1998-2010) was employed to examine the development of the outcome variables over time. Parameters in the models were estimated using the maximum likelihood estimator. The LGC models were first tested without predictors to determine the developmental trajectory of the

outcome variables. Next, we tested the association between program participation and the development of the outcome variables. Finally, interaction effects between program participation and child gender, parent educational level, frequency and intensity of maternal alcohol use, and maternal alcohol-related problems were examined. Results of these analyses are displayed in table 1, in which the first row displays the results of the LGS models without predictors. The second row (condition) displays the main effects of program participation on the intercept and slope of the outcome variables. The other rows display the interaction effects of for example condition\*gender, also including the main effects of condition and gender.

## Results and Conclusions

Results showed that, at baseline, children in the control group reported higher drinking refusal self-efficacy at baseline. The children in the control group also showed a stronger decrease in drinking-refusal self-efficacy over time. Further, there were no main program effects or interaction effects on the development over time of the proposed mediators of the "In control: No alcohol!" prevention program.

Table 1 Condition and interaction effects on growth curves of parenting and child variables

	Rules		Quality Communication		Self-efficacy		Positive Expectancies		Negative Expectancies		Intention to drink	
	I	S	I	S	I	S	I	S	I	S	I	S
Means	4.87**	-.00	4.10**	-.02	4.91**	.08**	1.93**	.06**	2.17**	.09**	2.80**	.07**
Condition	.06	.02	-.03	.03	.08*	-.14*	-.07	.02	-.05	.03	-.01	-.09
Condition*gender	-.05	-.03	-.06	-.31	.09	.00	.26	-.09	-.19	-.00	.29*	-.09
Condition*SES	-.12	-.08	-.14	.14	-.13	.26	.03	.28	-.02	.37	-.02	.05
Condition*AFM	.03	-.08	-.01	-.06	.06	-.22	.02	.18	.05	.15	-.10	-.03
Condition*AIM	.07	-.08	-.02	.04	-.02	-.11	.04	.01	.12	.10	-.13*	.02
Condition*APM	.16	-.40	.12	-.45	-.02	-.06	-.04	.32	.35	.27	-.30	.23

Note. \*  $p < .05$ , \*\*  $p < .001$

# Chapter 13

## General discussion





The current thesis aimed to provide a better understanding of the role of parents in the formation of alcohol-related cognitions and alcohol use in their children and to study the effectiveness of an alcohol-prevention for six grade elementary school children and their mothers. In this last chapter, the most prominent findings will be summarized and discussed, while providing a helicopter view on the combined findings from different individual chapters. These combined findings will be linked to the theoretical framework that was presented in the introductory chapter on the role of parents in the development of alcohol-related cognitive frameworks and alcohol use. Concluding, possible directions for future research and prevention will be provided.

Summary of the main findings

Part 1: Risk factors in alcohol use from childhood to young adulthood	Chapters
· Children aged four to six that perceived their mothers to drink were more likely to enact alcohol use behaviors.	2
· Children aged six to nine had explicit positive and negative outcome expectancies on adult alcohol use. For older children, maternal alcohol use was inversely related to positive expectancies, while paternal alcohol use was positively related to positive expectancies.	3
· The association between parental alcohol use and children's alcohol initiation was mediated by alcohol-related memory associations.	4
· Over the course of adolescence, children of parents that set strict alcohol-specific rules and drink less were less likely to drink alcohol.	5, 6, 8
· Associations between more frequency of communication and less maternal alcohol use on the one hand, and less adolescent alcohol use on the other hand, were mediated by increased negative alcohol-related expectancies. Inverse associations between quality of communication, rules and disclosure on the one hand, and adolescent alcohol use on the other hand, were mediated by increased self-efficacy.	5
· Parental alcohol-related problems were positively associated with communication about alcohol, which was inversely related to excessive adolescent drinking and alcohol-related problems. Lenient parental attitudes about alcohol and parental alcohol-related problems were directly related to more excessive drinking and alcohol-related problems.	6
· Taken some differences due to parent gender and adolescent age, stronger parental drinking motives were associated with stronger adolescent drinking motives, which in turn were quite consistently related to more adolescent alcohol use and alcohol-related problems.	7

Part 2: In control: No alcohol!: Effectiveness of an alcohol prevention program	Chapters
· A pilot study showed promising program effects on putative mediators such as quality of communication, monitoring, perceived harmfulness of drinking, and intention to drink – up to six months after the program.	9, 10
· A randomized controlled trial showed that, 12 months after the program, children in the intervention conditions were not less likely to have initiated drinking.	12

**Reflections on the main findings**  
**Alcohol-related cognitive frameworks in children and how these relate to parental alcohol use**

Findings from chapters 2, 3, 4, and 5 show that parental alcohol use is related to alcohol-related cognitions in children, measured in different ways, when these children are as young as four years old. Previous research already showed that more parental alcohol use is associated with more positive or arousal expectancies in children from the age of eight years and older (Martino et al., 2006; Pieters et al., 2010). These findings were confirmed with those from chapters 3 and 5, which illustrated that when asked explicitly about alcohol expectancies, positive and negative expectancies indeed appeared to be related to parental alcohol use in younger children (seven years and older). In the studies described in chapters 3 and 5, children were prompted with a specific alcohol cue or question, after which the valence of their association was examined. Interestingly, when children were presented with a situation in which they were asked to freely associate or select a behavior, as was the case in the studies discussed in chapters 2 and 4, children that perceived their parents to drink more often were more likely to choose alcohol-related options compared to children that perceived their parents to drink less. This was already the case when children were four years old. Apparently, young children already have formed internal working models concerning alcohol, which are related to their parent's alcohol use. Not only are these alcohol-related cognitive frameworks activated when children are directly prompted with alcohol-related cues, they are even active when children were asked to freely associate or select a behavior.

**The impact of alcohol-specific parenting on adolescent alcohol use**

While the rather consistent effect of parental alcohol use on adolescent alcohol use (White et al., 2000; Alati et al., 2005; Duncan, Duncan, et al., 2006; Ryan et al., 2010; Van der Zwaluw et al., 2008) can be seen as a rather passive form of parental influence, parents can also actively try to influence alcohol use in their offspring by using different alcohol-specific parenting strategies. The impact of these active parenting strategies is discussed in the following paragraphs.

**Alcohol-specific rule setting.** Many previous studies across different age groups have consistently shown that alcohol-specific rule setting is an effective strategy in

preventing both early onset and an increase in adolescent alcohol use (Koning et al., 2010; Martino et al., 2009; Monshouwer et al., 2003; Van den Eijnden et al., 2011; Van der Vorst et al., 2009; Van der Zwaluw et al., 2010). Findings from chapter 5 confirmed that among several alcohol-specific parenting strategies, alcohol-specific rule setting is the most important predictor of young adolescents' alcohol use. Findings from chapter 8 extended previous work by providing knowledge on the developmental course of the influence of parental alcohol-specific rules on adolescent alcohol use from early adolescence to young adulthood. This developmental view is essential, given that during adolescent development, the individuation process is important, in which children increasingly strive for autonomy and self-determination (Gnaulati & Heine, 2001; Steinberg, 1990). In line with this process, findings from chapter 8 revealed that adolescent alcohol use increased over time and strictness of parental rules decreased over time. However, the association between strict alcohol-specific rule setting and less adolescent alcohol use remained present throughout adolescence. In sum, parents are able to prevent their adolescents' (increase in) alcohol use by setting strict and clear rules, also in times where they feel their influence is decreasing.

**Alcohol-specific communication.** Previous research on alcohol-specific communication focused mainly on the effects of frequency of communication (Abar et al., 2011; Ennett, Bauman, Foshee, et al., 2001; Miller-Day & Kam, 2010; Van der Vorst, Burk, et al., 2010). Also, research touched briefly on the effects of the quality of alcohol-specific communication (e.g. communicating in a constructive and respectful manner; Spijkerman et al., 2008; Van den Eijnden et al., 2011). Studies on both frequency as well as quality of communication showed mixed results. Therefore, we conducted two studies putting alcohol-specific communication in a broader framework of different parental behaviors and attitudes regarding alcohol. Findings from chapter 6 demonstrate that, when controlling for the effects of parents' alcohol-related problems on both frequency of communication and adolescent alcohol use, more frequent communication about alcohol was predictive of less heavy adolescent alcohol use and related problems. Findings from chapter 5 suggest that none of the aspects of alcohol-specific communication (frequency, quality, and disclosure) were directly related to adolescent alcohol use. However, they were inversely related to adolescent alcohol use indirectly through different adolescent alcohol-related cognitions. In light of the inconclusive literature on alcohol-specific communication that exists so far, these results do hint at a protective effect of alcohol-specific communication. While the results show an association between high quality, frequent parent-child conversations about alcohol and less adolescent alcohol use and related problems, they still fail to provide a clear picture of the when and how of effective alcohol-specific communication. Therefore, before any firm conclusions or recommendations on alcohol-specific communication can be made, further research should examine what the sensitive time periods are for effective communication. Further, real interaction patterns should be observed to disentangle the exact content and tone of effective communication.

### Indirect parental influences through adolescent alcohol-related cognitive frameworks

Both the current thesis as well as previous research have supported the assumption that parents can exert a direct influence on their children's alcohol use through either modeling effects of their own alcohol use behaviors (Alati et al., 2005; Duncan, Duncan, et al., 2006; Ryan et al., 2010; Van der Zwaluw et al., 2008; White et al., 2000) or through their alcohol-specific parenting efforts (Koning et al., 2010; Martino et al., 2009; Van den Eijnden et al., 2011; Van der Vorst et al., 2009). Many theories agree that behaviors do not fall out of thin air, but are preceded by cognitions related to these behaviors (Bretherton, 1999; Campbell & Oei, 2010; Pajares, 1997; Zimmer-Gembeck & Collins, 2006). Findings on the possible mediating effect of several of these child cognitions between parental influences and adolescent alcohol use are explained in the following paragraphs.

**Memory associations.** Chapter 4 extended the findings of previous studies that indicated memory associations to be predictive of alcohol use in drinkers (Krank & Goldstein, 2006; Palfai & Wood, 2001; Stacy, 1997; Thush et al., 2007) by demonstrating that memory associations mediated the association between perceived parental alcohol use and adolescent alcohol initiation. More specifically, more perceived parental alcohol use was directly associated with an increased probability of alcohol initiation in adolescents, but also indirectly by a higher number of alcohol-related associations reported by adolescents. The finding that, even before adolescents start drinking, behaviors of parents might be associated with the precursors of alcohol should be incorporated into future prevention efforts.

**Refusal self-efficacy.** Also important in the early phase of alcohol use is drinking refusal self-efficacy, which has been shown to be mainly related to the choice whether or not to drink (Baldwin et al., 1993; Lee & Oei, 1993). Findings from chapter 5 suggested that on top of a direct association between strict alcohol-specific rules and a lower chance of adolescents' drinking, there was an indirect association through increased self-efficacy. Further, there appeared to be no direct association between quality of alcohol-specific communication and parental disclosure about their drinking on the one hand and adolescents' drinking on the other hand. However, higher quality of alcohol-specific communication and parental disclosure about their drinking was related to lower odds of adolescents' drinking by increasing adolescents' self-efficacy. These findings were in accordance with a previous study, in which more parental monitoring was related to lower adolescent alcohol use by increased self-efficacy (Watkins et al., 2006). Although these results should be confirmed in further research using longitudinal datasets, they do suggest that discussing limits concerning alcohol in a supporting and open way is related to adolescents' alcohol use by enhancing their confidence in being able to refuse alcohol.

**Expectancies.** Findings from chapter 5 showed that, besides self-efficacy, alcohol-related outcome expectancies are also part of adolescents' alcohol-related cognitive framework through which alcohol-specific parenting is related to adolescent alcohol use.

Specifically, although effect sizes were rather small, higher frequency of communication and less maternal alcohol use appeared to be associated with less adolescents' alcohol use through increased negative expectancies. This finding corresponded to the findings of Campbell and Oei (2010) that parental alcohol use was related to adolescent alcohol use through alcohol expectancies. While these results on expectancies do provide support for the intergenerational model of cognitive transference proposed by Campbell and Oei (2010), they should be viewed as preliminary, since both studies utilized cross-sectional datasets and effect sizes were relatively small. Further, a reason why effects through expectancies in this study might have been small is that the sample participating in this study consisted of early adolescents of which the majority is not a regular drinker. Outcome expectancies might change in later stages of alcohol use, when adolescents have had more experience with drinking. This would be in line with studies suggesting that alcohol expectancies are mainly related to the amount of alcohol consumed, and not to so much to the choice of whether or not to drink (Baldwin et al., 1993; Lee & Oei, 1993). Before definite conclusions can be made on outcome expectancies as part of adolescents' alcohol-related cognitive frameworks, further research in adolescents with different drinking statuses and using longitudinal designs is recommended.

**Drinking motives.** Findings presented in chapter 7 suggested that when adolescents become older and get better in interpreting environmental cues, for example from their parents, extension of the cognitive model of intergenerational transmission with parental cognitions might be valid. During the later stages in development of alcohol use, when adolescents already have acquired a drinking pattern, this study as well as previous ones showed that drinking motives are predicting (different patterns of) alcohol use (Adams et al., 2012; Cooper, 1994; Cooper et al., 1992; Müller and Kuntsche, 2011; Kuntsche et al., 2008; Kuntsche et al., 2010). In extension to these studies, and the study of Windle and Windle (2012), chapter 7 indicated that stronger parental drinking motives are associated with stronger drinking motives in their young adult children. Although there were some differences with regard to parent gender and adolescent age, and these results do need further exploration, this study provided support for the extended cognitive model of intergenerational transference (Campbell & Oei, 2010), assuming that parent cognitions are related to child cognitions, at least during late adolescence and early adulthood.

### Development of alcohol use: explaining the role of parents

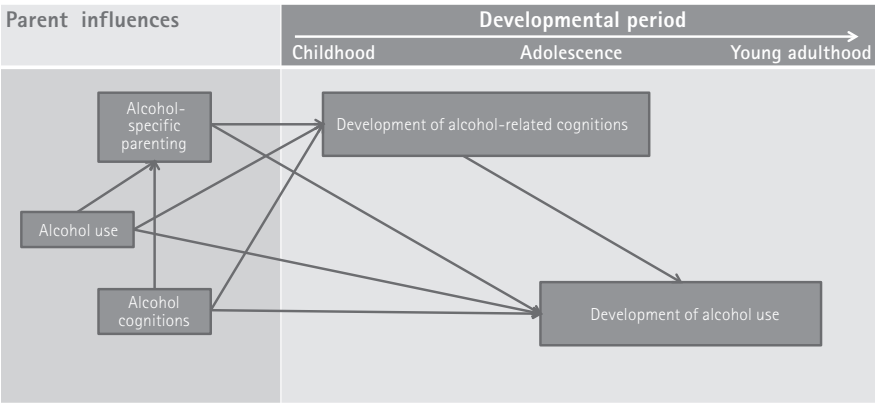
Multiple theories proposed some kind of underlying mechanism to explain how parent behaviors are related to child behaviors. For example, attachment and psychoanalytic theory proposed that, by interacting with their environment, children develop and internalize a system of schemes to apprehend the world, also called internal working models (Bretherton, 1999; Stern, 1985). More specific, according to Bandura's social cognitive theory, the link between one's environment (parenting) and one's actions (alcohol use) can be regulated by an individual's self-regulatory system (Bandura, 1986), which is a

combination of both the beliefs of one's own self-efficacy and the beliefs about likely outcomes (Bandura, 2004; Pajares, 1997). Others have called this same mechanism the cognitive model of intergenerational transference (Campbell & Oei, 2010). While all these theories and proposed mechanisms are derived from different schools in psychology, they share a common idea about what kind of mechanism is underlying the association between parent behaviors and child behaviors. They all state that, by experiencing and interacting with their environment, children will develop a set of ideas, cognitions, or schemes that will get more and more internalized over time. Consequently, children's internalized systems will partly determine which behaviors they will or will not engage in.

Based on findings from previous research and from part 1 of this thesis, we propose that the different theories discussed above can be applied to explain the development of alcohol use in children. Together, the ideas, cognitions and schemes children have regarding alcohol use will be called an alcohol-related cognitive framework. As was mentioned in the general introduction (chapter 1), such an alcohol-related cognitive framework will develop over time, starting in infancy and eventually result in actual alcohol use behaviors during adolescence or young adulthood (Figure 1). This thesis added information on the early developmental stages of such an alcohol-related cognitive framework, indicating that observable behaviors such as parental alcohol use contribute to the development of alcohol-related cognitions such as alcohol-related play behavior, associations, and outcome expectancies (chapters 2, 3, and 4). As shown in chapters 4 and 5, alcohol-related cognitions in children are related to the early stages of alcohol use in adolescents, and not only parental alcohol use, but also alcohol-specific parenting practices such as rule-setting and communication about alcohol are related to children's alcohol-related cognitive frameworks. These alcohol-specific parenting practices are also directly related to different stages of adolescents' drinking behaviors (chapters 6 and 8). Finally, the current thesis added to the framework by showing that parental alcohol-related cognitions are a determining factor. Chapter 6 indicated that parent cognitions such as attitudes towards alcohol were related to alcohol-specific parenting practices, but also to more excessive stages of alcohol use. Even during young adulthood, chapter 7 showed that parent cognitions towards alcohol (drinking motives) are related to alcohol-related cognitions of their offspring and that different motives for drinking are related to different stages of alcohol use.

Concluding, the combined findings from this thesis provide a first basis for the proposed development of children's alcohol-related cognitive frameworks and the potential role parents play in the formation of this framework during different developmental periods. Although further testing of the proposed developmental framework is necessary, we hope that, given the robust theoretical underpinning of the proposed developmental framework as discussed above, it can serve as a broad foundation to inspire future research on the development of alcohol use in children and adolescents.

Figure 1 Framework on parenting and alcohol use.



Effectiveness of the prevention program "In Control: No alcohol!"

In the second part of this thesis, we aimed to study the effectiveness of an alcohol-prevention program for six grade elementary school children and their mothers. Chapters 9 and 10 describe the findings from a first pilot study which was meant to assess how the alcohol prevention program would be received by children and parents and whether preliminary effectiveness of the program on its putative mediators could be shown. Preliminary analyses showed that 75% of mothers and children completed over half of the program, which is in accordance with other comparable programs (Bauman et al., 2002; Jackson & Dickinson, 2003). Further, participation in the program led to an increased frequency of alcohol-specific communication, even more so when mothers reported alcohol-related problems. Given that the program is home-based and provides parents and children a free choice in how and when to complete the program, these combined findings indicated that the mother-child dyads were actively involved in the program.

Besides these positive results on program participation, findings suggest that, on the short term, the program resulted in increased parental monitoring and more parents and children setting up a non-drinking agreement. Also, six months after completion of the program, it resulted in children perceiving alcohol to be more harmful and having a lower intention to drink. In addition to a direct program effect on perceived harmfulness of drinking, findings demonstrated that the program indirectly increased children's perceived harmfulness of drinking through encouraging parents to set up a non-drinking agreement. An indirect effect on perceived harmfulness of drinking, but then via increased frequency of communication, was shown, but only for boys. Together, these results provided a first indication that the 'In control: No alcohol!' program is effective, at least on the putative mediators. Although program effects on important parenting variables such as alcohol-specific rule setting and quality of communication were not found for the total sample,

findings did indicate that the program led to increased quality of alcohol-specific communication for mothers that experienced alcohol-related problems. Since children of these mothers are known to have an increased risk of early and heavy alcohol use (Alati et al., 2005; Sartor, Lynskey, Heath, Jacob, & True, 2007), these findings hint at possible stronger program effects for at-risk children, as has also been found in previous prevention studies (e.g. Jackson & Dickinson, 2006; Koning, 2011).

Further, we conducted a randomized controlled trial including a behavioral outcome measure to examine whether the 'In control: No alcohol!' program would be effective in delaying the age of alcohol onset in children. The behavioral assessments 12 months after completion of the program did not show any effects on children's alcohol initiation rates, although the program was positively received by mothers and children (Chapter 12). Additional analyses revealed that there was also a lack of program effects on the putative mediators such as alcohol-specific rule setting and communication and child cognitions such as self-efficacy, expectancies, and intention to drink (Appendix). Several factors related to the trial design such as timing and sample characteristics could have resulted in this lack of program effects in the present study. During the last decade, there has been increased (societal and governmental) attention for and awareness of the risks of alcohol use in young adolescents (Verdurmen, Vermeulen-Smit et al., 2012). During this period, parental alcohol-specific rules have become more strict (Verdurmen, Vermeulen-Smit, et al., 2012), and lifetime- as well as current alcohol use in especially young adolescents has decreased (Verdurmen, Monshouwer et al., 2012). The same message that was communicated through the program – that alcohol use is risky for young children and that parents should set strict rules – was communicated to the entire Dutch population through governmental campaigns at the exact time during which the study was conducted. In this changing context, the intended young target group and strictness message that seemed theoretically appropriate while developing the 'In control: No alcohol!' program might have been caught up by reality, which might have eliminated the possibility for finding program effects. If the program is to be effective, it should be adjusted to these changes, meaning that an older target group and a more conservative alcohol norm might be more appropriate in order to distinguish it from mainstream governmental policies, and make effects visible. This is especially important given the fact that the Dutch government just agreed to increase the legal age for buying alcohol from 16 to 18 years old.

Several meta-analyses and systematic reviews on substance (ab)use prevention showed that targeting high-risk youth may yield stronger effects than targeting the general population (Bröning et al., 2012; Gottfredson & Wilson, 2003; Foxcroft & Tsertsvadze, 2012). In light of these findings, one could also argue that universal alcohol prevention such as the 'In control: No alcohol!' program might not be effective, especially compared to selective prevention efforts. Adding to this, mothers and their children could voluntarily sign up to participate in the present program. This has probably resulted in a low-risk sample, which is supported by the mean number of alcoholic drinks a week for women,

which is 4.2 in the general Dutch population ([www.cbs.nl](http://www.cbs.nl)), and 3.5 for women in the current study. In future studies and during eventual implementation of such programs, an active effort should be made to include the at-risk or at least the general drinking population. Further, as results of a combined school- and parent-based alcohol prevention program (Koning, 2011) and findings in the first part of this thesis showed, targeting not only parents and their behaviors, but also children and their alcohol-related cognitive frameworks in prevention programs might be a prerequisite for prevention programs to be effective. Perhaps combining the 'In control: No alcohol!' program with an approach directly targeted at children's alcohol-related cognitive frameworks could be a fruitful avenue for future prevention efforts, although the effectiveness of such prevention strategies should first be disentangled in future research.

## Gaps of knowledge

### Measurement of alcohol-related cognitive frameworks in children: future challenges

While trying to measure alcohol-related cognitive frameworks in young children, two issues that still need to be addressed arise. The first issue is related to measurement difficulties. As previously mentioned, measuring young infant's cognitive frameworks towards alcohol use poses a challenging task, since young children have limited language abilities, are extremely susceptible to the social desirability bias, and might not always be aware themselves of what they know and think (Einarsdóttir, 2007). Therefore, in chapters 2 and 3, we aimed to get round these challenges by using different ways of measuring alcohol-related cognitive frameworks. In chapter 2, children were asked to pretend play their birthday party as adults, assuming that pretend play would reflect their internal representation of alcohol use in their environment. Although it has been suggested that pretend play in children serves to understand their environment (Lillard, Pinkham, & Smith, 2010), this specific measure has not been validated and it is not to be said that it actually reflects an internal alcohol-related cognitive framework instead of mere modeling behavior. In chapter 3, we used the Berkeley Puppet Interview (Measelle et al., 1998) to measure explicit alcohol-related expectancies in children while trying to avoid the social desirability bias. Previous studies using adolescent samples indicated that explicit cognitions differ from implicit cognitions (Noel & Thomson, 2012; Pieters et al., 2010; Thush & Wiers, 2007), and this difference might be even larger for young children, especially since they have limited language abilities (Einarsdóttir, 2007). Construct validation of these different measures in children is needed.

The second issue when measuring alcohol-related cognitive frameworks in children concerns the predictive validity. Findings in this thesis do suggest that alcohol-related cognitive frameworks exist in children, and based on theory, the expectation is that these frameworks would be predictive of subsequent alcohol use behaviors during adolescence.



Studies during late childhood indeed demonstrate that expectancies and knowledge about alcohol brands predicted subsequent drinking behaviors (Austin & Nach-Ferguson, 1995; Cameron et al., 2003). Nonetheless, these children are closer to the age of alcohol initiation. The question arises whether there will be a delayed effect of alcohol-related cognitive frameworks in early childhood in alcohol use behaviors during early adolescence. The present study's design did not allow investigating whether these frameworks are indeed predictive of alcohol use later in life. To examine this, longer follow-ups of children in longitudinal designs or sequential cohort studies are needed.

### Moms versus dads: differences in effects

Despite the fact that findings from the present thesis suggest that behaviors of mothers and fathers are differentially related to children's alcohol-related cognitive frameworks and drinking behaviors, the findings from the different chapters do not provide a coherent picture of what these differences exactly are. For example, in chapter 2 it was demonstrated that only perceived mother's alcohol use was predictive of children's play behaviors. In chapter 3, it was suggested that maternal alcohol use was inversely related to positive alcohol expectancies, and that paternal alcohol use was positively related to the same expectancies. Chapters 6 and 8 indicate that for adolescents, paternal alcohol use was predictive of alcohol use, and maternal alcohol use was not. Since the dependent variables differed in all these studies, and parental alcohol use was reported on in different ways by either parents or children, no firm conclusions can be based on these combined findings. Still, they do point out that parents might play different roles when it comes to the development of alcohol-related cognitive frameworks and alcohol use in their children.

Stronger effects of paternal drinking compared to maternal drinking on adolescent alcohol use have been found in previous research (Chassin et al., 1996; Lieb et al., 2002; Rohde et al., 2001). Previous studies also found that paternal alcohol use was more strongly related to children's expectancies (Handley & Chassin, 2009; Pieters et al., 2010). These findings could be explained by the fact that, first of all, mothers are known to drink less alcohol compared to fathers (Van Laar et al., 2010). Moreover, mothers are less likely than fathers to drink alcohol in front of their children (Verdurmen et al., 2008). When alcohol use of mothers occurs less, especially in the presence of their children, it decreases the possibility of finding effects of maternal alcohol use on adolescents' alcohol use. Differences in effects due to parent gender during early childhood have been under exposed and deserve further examination.

Another interesting avenue for future research is how paternal and maternal alcohol-specific parenting and cognitions are differentially related to adolescents' thoughts and actions. From the general parenting literature, we know that fathers might employ more indirect parenting strategies, while mothers are supposed to use more direct strategies (Cabrera et al., 2007; Tamis-LeMonda et al., 2004). Also, mothers tend to provide more sensitivity, structure and stability, while fathers tend to be more spontaneous and play

more with their children (Lewis & Lamb, 2003). Some first efforts have now been made to examine differences in mother and father effects when it comes to parent cognitions regarding alcohol (Chapters 6 & 7; Windle & Windle, 2012), although further exploration of gender differences in alcohol-specific parenting and cognitions should be a main goal in future studies.

The gender issues described above immediately hint at a serious limitation of the studies described in chapters 5, 9, 10, and 12. These studies examined effectiveness of a selected set of alcohol-specific parenting practices and the effectiveness of an alcohol prevention program, but included only mothers. While there were sound practical reasons to include only mothers (as described in chapter 11), findings would have been more robust when fathers would have been included as well, especially given the stronger effects of paternal alcohol use on their children. Perhaps, targeting mothers or fathers would have resulted in different program effects, or program effects would have been stronger when both mothers and fathers would have been included simultaneously. Concluding, parent gender serves as a potential moderator and should be included when examining the role of parents in children's development of alcohol use.

### Alcohol-specific parenting: tell parents to do what exactly?

This question concerns what exactly parents should be told to do, considering the growing body of research on alcohol-specific parenting. For example, the consistent research findings on the effectiveness of strict alcohol-specific rules in tempering adolescents' alcohol use have only confirmed this association in a linear fashion. More complex analyses of this association, including quadratic associations, are needed to assess whether parents should always be advised to set strict rules. In the developmental literature the importance of the individuation process, in which adolescents increasingly strive for autonomy and self-determination (Gnaulati & Heine, 2001; Soenens & Vansteenkiste, 2005; Steinberg, 1990), is stressed. It could be that the most optimal level of strictness differs according to adolescents' developmental stage or personality characteristics. Also, examining quadratic associations could indicate that there is a turning point after which stricter rules decrease in effectiveness. The same accounts for frequency of alcohol-specific communication, on which research findings are not consistent. No consensus has been reached on the question of whether higher frequency of communication is associated with decreased or increased of alcohol use, or whether it is not associated at all. Longitudinal studies with a developmental perspective and employing statistical techniques such as growth curve modeling (Muthén and Muthén, 1998-2010) could provide information on how often and when parents should have these conversations about alcohol.

Besides the timing and intensity of alcohol-specific parenting, the context of alcohol-specific parenting is an important factor to take into account as well. Findings in chapter 6 suggested that the effectiveness of frequency of alcohol-specific communication might be dependent on parent's own alcohol use behaviors. Also, there is evidence



suggesting that parenting profiles instead of specific parenting behaviors are better predictors of alcohol use (Koning et al., 2012). Although these studies suggest that combinations of behaviors, such as rule-setting, alcohol use, and frequency and quality of communication, are important predictors of adolescent alcohol use, they still lack the specificity of what parents should communicate to their children and how they should do this. Observational research methods are thought to be a solid measurement framework when it comes to socialization effects and generating successful prevention strategies (Dishion & Granic, 2003). Investigating parent-child interactions in a naturalistic observational setting would allow for analyzing more specific characteristics of alcohol-specific parenting. Ultimately, this would lead to hands-on information that parents could be provided with in prevention programs.

### Interaction with the broader environment

While this thesis focused exclusively on parent socialization effects regarding alcohol use, influences from the broader environment in which children develop might directly affect children and interact with these parenting influences. For example, peers are known to be important socialization agents as well, especially during adolescence (Brown & Bakken, 2011). In the alcohol literature, peer drinking has been clearly shown to be a determining factor in adolescents' alcohol use (Donovan, 2004; Larsen et al., 2010; Poelen et al., 2009). These associations with peer alcohol use are often contributed to a peer influence effect. However, the question arises whether adolescents become more similar to their peers or do adolescents choose peers that are similar to them? This so-called selection effect has also been demonstrated to exist, especially during early adolescence, while influence effects appear to be stronger during middle or late adolescence (Burk, Van der Vorst, Kerr, & Stattin, 2012; Jaccard, Blanton, & Dodge, 2005). Findings from chapter 5 suggested that alcohol-specific parenting and adolescents' drinking refusal self-efficacy are associated. This might serve as an indication that parents could hamper the peer influence effect, since increased drinking refusal self-efficacy might be especially salient in social contexts including friends. On the other hand, one could also imagine that parents would be able to influence the peer selection effect by guiding adolescents in which friends to choose. To our knowledge, there is very little existing research on these moderating and mediating effects of parents on peer influences in an alcohol-specific as well as general context. Further, the few exploratory studies that do exist did not lead to definite conclusions yet (Engels et al., 2007; Marshal & Chassin, 2000; Mounts, 2000; Tornay et al., 2013) and did not include adolescents' alcohol-related cognitions such as drinking refusal self-efficacy. Future studies should shed light on the moderating and mediating effects parents can have on peer influence and selection effects and how alcohol-related cognitions intervene between parent and peer socializing influences and the development of alcohol use in adolescents.

### Implications for prevention

Although the findings from this thesis could not testify for the effectiveness of the 'In control: No alcohol!' prevention program in its present form, we hope that the present thesis may provide guidance for the improvement of the program or potential new prevention efforts.

First, when implementing prevention programs, correct timing is an aspect that should be considered carefully. As can be concluded from part 1 of this thesis, the development of alcohol-related cognitive frameworks and alcohol use in children and adolescents over time is dependent on different parenting factors such as parental alcohol use, alcohol-specific parenting and parental alcohol-related cognitions. In addition, a review of previous effective prevention efforts has indicated that the developmental appropriateness of a program partly determines whether it will generate positive effects or not (Nation et al., 2003). Evidently, observable parent behaviors are mostly important during childhood, while more complex parenting efforts become more relevant during adolescence. When considering the correct timing of an alcohol prevention program, findings from part 2 of this thesis implied that the societal context in which the program will be implemented matters as well. The effectiveness of the 'In control: No alcohol!' program was examined during a time when there has been increased attention for and awareness of the risks of alcohol use in young adolescents, parents have become more strict with regard to alcohol (Verdurmen, Vermeulen-Smit, et al., 2012), and lifetime- as well as current alcohol use in especially young adolescents has decreased (Verdurmen, Monshouwer, et al., 2012). Therefore, the lack of program effects in this particular study might be explained by off timing. Future efforts in alcohol prevention should take into account when the target behavior (alcohol use) develops, and when specific predictors are developmentally salient before implementing programs. For the current program, a slightly older target group and a more conservative alcohol norm (for parents as well as children) might be have been more appropriate in order to generate effects.

Second, we propose an expansion of the target factors of the program. The 'In control: No alcohol!' program is mainly targeted at teaching parents how to interact with their children around the topic of alcohol. Parents are taught how to set clear boundaries concerning alcohol use while having high-quality conversations. Findings from part 1 of this thesis showed that on the parent side, not only alcohol-specific parenting, but also parents' alcohol use behaviors and cognitions are important factors to target in alcohol prevention. Despite the fact that parental alcohol use has consistently emerged as an important predictor of adolescent alcohol use (Alati et al., 2005; Blackson et al., 1999; Tildesley & Andrews, 2008; Van Zundert et al., 2006; White et al., 2000), it is rarely a targeted factor in existing prevention programs (Smit et al., 2008). In The Netherlands, where drinking alcohol is considered normative, it might indeed be difficult to tell parents not to drink, but creating awareness among parents about how their behaviors affect their children and advising them to drink as little as possible in the presence of their children is a

fruitful avenue for future prevention. On the child side, we recommend future prevention programs to target children's alcohol-related cognitive frameworks. The present thesis clearly provided evidence that these frameworks exist even before children initiate alcohol use. Further, they have shown to be predictors of alcohol use and are associated with parenting behaviors. A combined school- and parent-based alcohol prevention program targeting not only parents and their behaviors, but also children and their alcohol-related cognitive frameworks has already shown promising effects for Dutch adolescents (Koning, 2011). Teaching parents not only how they can alter their children's behaviors, but also how they can alter children's cognitions regarding alcohol, while at the same time targeting children and their alcohol-related cognitive frameworks directly, might lead to enhanced program effects.



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Dankwoord

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## Publications

### This Thesis

- Mares, S. H. W., Lichtwarck-Aschoff, A., Burk, W. J., Van der Vorst, H., & Engels, R. C. M. E. (2012). Parental alcohol-specific rules and alcohol use from early adolescence to young adulthood. *Journal of Child Psychology and Psychiatry*, 53, 798-805.
- Mares, S. H. W., Lichtwarck-Aschoff, A., De Leeuw R. N. H., & Engels, R. C. M. E. (2013). *Parental alcohol use and pretend alcohol use in young children*. Manuscript under review.
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- Vermeulen-Smit, E., Mares, S. H. W., Verdurmen, J. E. E., Van der Vorst, H., Engels, R. C. M. E., & Vollebergh, W. A. M. (in press). Mediation and moderation effects of an in-home family intervention: The "In control: No alcohol!" Pilot Study. *Prevention Science*.

### Other Publications

- Mares, S. H. W., De Leeuw, R. N. H., Scholte, R. H. J., & Engels, R. C. M. E. (2010). Facial attractiveness and self-esteem in adolescence. *Journal of Clinical Child and Adolescent Psychology*, 39, 627-637.
- Mares, S. H. W., Lichtwarck-Aschoff, A., Burk, W. J., Van der Vorst, H., & Engels, R. C. M. E. (2012). Regels van ouders en alcoholgebruik van adolescenten. *Tijdschrift voor Psychiatrie*, 4, 54.

### Nederlandse Samenvatting (*Dutch Summary*)

Het drinken van alcohol tijdens de adolescentie wordt in verband gebracht met verschillende negatieve gevolgen zoals ongelukken, agressie, risicovol seksueel gedrag, en ook een grotere kans op alcoholverslaving op latere leeftijd. Toch drinken Nederlandse jongeren relatief vroeg en veel en is een belangrijke vraag hoe dit zou kunnen worden voorkomen. Uit eerdere studies bleek dat ouders hierin mogelijk een rol kunnen spelen, maar voldoende kennis over wat ouders dan precies zouden moeten doen en of een preventieprogramma hier een rol in kan spelen ontbrak nog. Daarom hebben we in dit proefschrift enerzijds onderzoek gedaan naar de ontwikkeling van alcoholgerelateerde cognities en alcoholgebruik bij kinderen en de rol van ouders hierin. Anderzijds hebben we de effectiviteit onderzocht van een alcohol preventie programma gericht op kinderen uit groep acht van de basisschool en hun moeders.

#### Deel 1. Risicofactoren voor alcoholgebruik van de kindertijd tot de jonge volwassenheid

Deel 1 van dit proefschrift draait om de potentiële risicofactoren en beschermende factoren met betrekking tot de ontwikkeling van alcoholgebruik onder jongeren. Hierbij hebben we specifiek onderzoek gedaan naar de rol van ouderlijk alcoholgebruik en alcoholspecifieke opvoeding (regels, communicatie en attitude) als voorspellers voor alcoholspecifieke cognities en alcoholgebruik onder kinderen.

In *hoofdstuk 2* wordt een quasi experimentele studie beschreven waarin we probeerden te onderzoeken of kinderen in de leeftijd van vier tot zes jaar al ideeën hebben over alcoholgebruik en of deze ideeën gerelateerd zijn aan het alcoholgebruik van ouders. De kinderen werd gevraagd om in een speelhoek te spelen en te doen alsof ze volwassenen waren die hun verjaardag vierden. Gekeken werd of kinderen deden alsof ze alcohol dronken. Hoe meer kinderen rapporteerden dat hun moeders dronken, hoe meer ze geneigd waren te doen alsof ze alcohol dronken in de speelhoek.

Het doel van de studie in *hoofdstuk 3* lijkt op dat van hoofdstuk 4, maar verschilt erin dat er iets oudere kinderen (zes tot negen jaar) direct werd gevraagd wat hun houding ten opzicht van alcoholgebruik was middels een interview methode met handpoppen, speciaal ontwikkeld voor jonge kinderen. Onderzocht werd of deze houding samenhangt met het alcoholgebruik van ouders en of deze verbanden afhankelijk zijn van leeftijd en geslacht van de kinderen. Voor oudere kinderen vonden we dat meer alcoholgebruik van de moeder samenhang met minder positieve verwachtingen ten opzichte van alcoholgebruik en dat meer alcoholgebruik van de vader samenhang met meer positieve verwachtingen.

De bevindingen van hoofdstukken 2 en 3 werden uitgebreid in *hoofdstuk 4* door niet alleen te kijken naar het verband tussen ouderlijk alcoholgebruik en houdingen van kinderen, maar door vervolgens ook te kijken of deze houdingen gerelateerd zijn aan het beginnen met drinken. In deze studie werden associaties die kinderen hebben met alcohol gemeten door te vragen wat het eerste in hen opkomt bij dubbelzinnige woorden zoals bijvoorbeeld

'kater'. Resultaten toonden aan dat meer ouderlijk alcoholgebruik inderdaad samenhang met meer alcoholgerelateerde associaties bij kinderen hebben en dat meer associaties vervolgens weer een voorspeller waren voor het beginnen met drinken.

In *hoofdstuk 5* onderzochten we of dit zogenoemde medierende effect van alcohol-specifieke houdingen of cognities ook geldt voor het verband tussen alcoholspecifieke opvoeding en alcoholgebruik onder adolescenten. We vonden dat vaker communiceren over alcohol en minder drinken van de moeder verband hield met meer negatieve verwachtingen ten opzichte van alcoholgebruik en vervolgens met minder daadwerkelijk alcoholgebruik. Ook vonden we dat een hogere kwaliteit van communicatie, meer openheid van ouders over hun eigen alcoholgebruik en striktere regels samenhangen met een hogere zelfweerbaarheid van adolescenten in sociale situaties. Deze hogere zelfweerbaarheid was vervolgens weer gerelateerd aan minder daadwerkelijk alcoholgebruik.

In *hoofdstuk 6* werd voor het eerst gekeken naar de wisselwerking tussen ouderlijk alcoholgebruik, de attitude van ouders ten opzichte van alcohol en alcoholspecifieke opvoeding in het voorspellen van zwaar drinken onder adolescenten. Wanneer ouders problemen rapporteerden met betrekking tot hun eigen alcoholgebruik, bleken ze meer te communiceren over alcohol, wat vervolgens samenhang met minder excessief drinken en alcoholgerelateerde problemen onder adolescenten. Tolerante attitudes van ouders ten opzichte van het alcoholgebruik van kinderen en meer problemen van ouders met hun eigen alcoholgebruik waren geassocieerd met meer excessief drinken en alcoholgerelateerde problemen onder adolescenten.

Cognities van ouders met betrekking tot alcoholgebruik, en dan met name motieven om te drinken, werden verder onderzocht in *hoofdstuk 7*, maar dit keer in relatie tot dezelfde cognities bij adolescenten. Het ging dan om bijvoorbeeld 'drinken omdat het gezellig is', 'drinken om je zorgen te vergeten' en 'drinken omdat je je daar beter door voelt'. Hoewel de resultaten niet heel eenduidig waren, waren over het algemeen sterkere motieven bij ouders gerelateerd aan sterkere motieven bij adolescenten. Deze sterkere motieven bij adolescenten waren dan vervolgens weer voorspellend voor meer alcoholgebruik en meer problemen ten gevolge van dit alcoholgebruik.

In *hoofdstuk 8* werd geprobeerd een overzicht te geven van de ontwikkeling van het verband tussen alcoholspecifieke regels en alcoholgebruik onder kinderen van de vroege adolescentie tot de jonge volwassenheid. We vonden dat, hoewel regels over het algemeen minder strikt worden en adolescenten over het algemeen meer gaan drinken naarmate ze ouder worden, strikte regels verband hielden met minder drinken over het hele verloop van de vroege adolescentie tot in de jonge volwassenheid.

Uit deze bevindingen kunnen we *concluderen* dat kinderen al op jonge leeftijd beginnen met het ontwikkelen van een alcoholgerelateerd kader en dat ouders zeker een rol kunnen spelen in de ontwikkeling van dit kader, voornamelijk door hun eigen alcoholgebruik en door strenge regels te stellen. Verder onderzoek is nodig naar bijvoorbeeld de precieze rol van communicatie over alcohol en (de manier van meten van) alcoholspecifieke cognities bij zowel jonge als oudere kinderen.

## Deel 2. In control: No alcohol!: Effectiviteit van een alcohol preventive programma

Deel 2 van dit proefschrift beschrijft een tweetal studies die zijn ondernomen om te onderzoeken of het programma 'Hou vol: Geen alcohol!' effectief is in het voorkomen van alcoholgebruik onder kinderen. Om dit te doen werd gekeken of het programma effect had op alcoholspecifieke opvoeding, alcoholgerelateerde cognities bij kinderen en ook het daadwerkelijke alcoholgebruik van kinderen.

In *hoofdstuk 9* werd specifiek gekeken of deelnemende moeders aan het programma direct erna meer regels stelden, meer communiceerden over alcohol, meer toezicht houden en of ze vaker een niet-drinken contract opstelden. Ook werd gekeken of het dan uitmaakt of moeders wel of niet drinken en wel of geen problemen ervaren ten gevolge van hun alcoholgebruik. We vonden dat moeders inderdaad meer toezicht hielden na deelname aan het programma en dat er vaker een niet-drinken contract werd opgesteld. Na deelname aan het programma was de kwaliteit van communicatie over alcohol hoger voor moeders die problemen rapporteerden ten gevolge van hun alcoholgebruik.

Effecten over een iets langere termijn (zes maanden) werden onderzocht in *hoofdstuk 10*. Het bleek dat kinderen die deelnamen aan het programma een lagere intentie hadden om te beginnen met drinken en alcohol als meer schadelijk beoordeelden. Dit laatste effect werd zowel direct door het programma aangetoond als indirect doordat ouders en kinderen vaker een niet-drinken contract opstelden. Een indirect effect via een verhoogde frequentie van communicatie werd ook gevonden voor jongens, maar niet voor meisjes.

*Hoofdstuk 11* beschrijft de methode van een grote gecontroleerde studie naar de effectiviteit van het programma in het voorkomen van daadwerkelijk alcoholgebruik bij kinderen. In *Hoofdstuk 12* worden de resultaten gepresenteerd, waaruit blijkt dat het programma 12 maanden later geen effect had op het alcoholgebruik van kinderen. Uit de resultaten die worden getoond in de *Appendix* blijkt dat er ook geen effecten zijn op de voorgestelde mediators zoals regels, communicatie en cognities.

Gebaseerd op deze bevindingen moeten we vooralsnog *concluderen* dat het programma onder de omstandigheden van deze studie niet effectief is in het voorkomen van alcoholgebruik bij kinderen. Daar zouden verscheidene redenen voor kunnen zijn; bijvoorbeeld dat de timing niet juist was (verkeerde leeftijdsgroep, samen met verschillende overheids-campagnes), dat we te maken hadden met een selectieve steekproef met bij voorbaat een laag risico op alcoholgebruik, het aanpakken van de verkeerde factoren (meer richten op alcoholspecifieke cognities bij kinderen) of misschien de algemene minimale effectiviteit van algemene preventie. Bij toekomstige inspanningen om alcoholgebruik aan te pakken zou aan deze overwegingen aandacht moeten worden geschonken.

## Dankwoord

Nou, daar ligt het dan.. Een boek van mijn hand, wie had dat ooit gedacht! Hoewel mijn naam op de voorkant staat, wil ik graag een aantal mensen bedanken die dit fantastische resultaat mogelijk hebben gemaakt.

Ten eerste *Rutger*, mijn promotor. Waar moet ik beginnen.. Je bent een man van vele facetten en in het begin moesten we geloof ik allebei even aftasten. Als stagiaire en later het jongste kippetje op de afdeling kwam ik vaak met zwetende handjes je kamer binnen voor een afspraak. Gaandeweg heb ik geleerd dat er niet zoveel dingen zijn die ik niet tegen je kan zeggen en dat je zelfs aanmoedigt dat mensen hun woordje klaar hebben. Je bent gedreven in wat je doet, wilt er altijd het meeste uithalen, en dit heb je weten over te dragen op mij. Bewonderenswaardig vind ik het hoe jij bij al je medewerkers zo betrokken bent. Bij iedere afspraak wist je niet alleen precies met welk paper ik bezig was, maar zelfs hoever ik was en welke resultaten ik had gevonden, soms beter nog dan ikzelf! Nu het boekje af is en jij een nieuw avontuur aangaat buiten de muren van de universiteit hoop ik toch dat onze samenwerking nog niet 'af' is.

Dan *Anna*, in eerste instantie werd ik tijdelijk bij jou ondergebracht en stiekem is dit uitgegroeid tot een begeleidingstraject van zo'n 3 jaar. Met al mijn vragen, frustraties, overwinningen en ook small-talk kon ik altijd bij je binnenlopen. In het begin moest ik even wennen aan je kritische, theoretisch blik, maar deze heeft geresulteerd in een aantal mooie papers die bovendien goed bij elkaar passen in dit uiteindelijke boekje. Van jou heb ik ook geleerd niet te snel tevreden te zijn; niet op de korte termijn met bijvoorbeeld een resultaat uit een analyse, maar ook niet op de lange termijn met wat ik allemaal nog wilde doen en bereiken in mijn tijd als PhD student. Naast kritisch ben je ook heel open en zachtaardig en deze combinatie heeft ervoor gezorgd dat ik mezelf altijd gelukkig heb geprezen met een dagelijks begeleidster als jij.

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## Curriculum Vitae

Suzanne Mares was born on April 3<sup>rd</sup> 1986 in Maastricht, the Netherlands. After completing secondary education (VWO) in 2004, she moved to Nijmegen to study Pedagogical Science at the Radboud University. While enjoying the college life in all its dimensions, she discovered that gaining knowledge in an academic environment was something she wanted to pursue further. In 2009, she graduated from the Research Master Behavioural Sciences. After graduating, she spent a year studying Religion Sciences, while performing a pilot study under supervision of Haske van der Vorst on the preliminary effectiveness of an alcohol prevention program aimed at elementary school children and their parents. When a grant became available to perform a large RCT to examine the effectiveness of the same program, she became a full-time PhD student at the Radboud University in Nijmegen. Under supervision of Rutger Engels and Anna Lichtwarck-Aschoff, the role of parents in the development of alcohol cognitions and alcohol use in adolescents and the effectiveness of the alcohol prevention program were examined. Besides doing her research, Suzanne was able to transfer the obtained knowledge to new students by teaching several courses. Resulting, she received a certificate for her teaching qualifications. Right after finishing her thesis in June 2013, she gave birth to a wonderful baby girl. After enjoying a few months of quality time with her daughter, as of January 2014 she will start as a teacher at the developmental psychopathology department of the Radboud University in Nijmegen.

